

ENTOMOLOGICA AMERICANA

VOL. VII (n. s.) BROOKLYN, N. Y., DECEMBER, 1926

No. 3

CLASSIFICATION OF THE NUT CURCULIOS [FORMERLY *BALANINUS*] OF BOREAL AMERICA

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The coleopterous genus *Curculio*, formerly known as *Balaninus*, comprises a well-defined group of species, the nut and acorn curculios, some of which, the true "nut weevils," as they have also been termed, are injurious to the fruit of the chestnut and chinquapin, the pecan and hickory, and the hazelnut or filbert. The remainder, as far as known, feed on the fruit of various oaks.

The genus is the type of the Curculionidae, a family of the Rhynchophora abounding in species which are seriously destructive to deciduous fruits and various other crops, including such important pests as the plum curculio, the boll weevil, various strawberry weevils, alfalfa weevil and the clover weevils, the pine weevils, rhubarb curculio, pepper weevil, tomato weevil, apple curculio, quince curculio, plum gouger, grape curculio, the chestnut curculios, and many others.

The distinguishing characters of the genus are (1) the extremely long and slender rostrum, or beak, and (2) the vertical mandibles. This latter character, taken in connection with the long slender rostrum, might entitle the genus to family rank¹ were it not that

¹ LeConte, Rhynch. Am. No. Mex., 1876, p. 322, used the term *Balaninidae* in connection with the genus *Balaninus*.

the former character is present in a few other genera, while in certain others the female rostrum is longer and more slender than in the short-beaked species of *Curculio*.

The genus *Curculio* was proposed by Linnaeus in his 10th edition of *Systema Naturae*, 1758, and Latreille, in 1810, designated *nucum* L. as the type. Nevertheless, the matter was apparently forgotten by coleopterists until Dr. W. D. Pierce called attention to it in recent years (*Proc. Ent. Soc. Wash.*, 1925, pp. 113, 114).

The paper here presented is a brief monograph, or unpretentious study, brought together as an aid for the identification of the various species of the genus *Curculio* which inhabit America north of Mexico. The group as a whole has always been most difficult to classify, even by expert coleopterists, but it is hoped that with the aid of the illustrations, and the descriptions and tables, the paper will tend to simplify the subject. In commenting on the classification of the genus, C. W. Leng, writing in 1916, aptly observed that the species resemble one another so closely as to make specific identification very difficult, and collectors generally have experienced great trouble in classifying the specimens in their collections. The writer will admit that, even with the presentation of the subject in this paper, difficulty will still be experienced unless the worker has access to considerable material representing many species. The females present the best characters for classification; the males are exceedingly difficult to separate.

In the table separating the species into groups, the length of the female rostrum, while somewhat arbitrary in some forms, is the most reliable character that has been found. It is quite otherwise with the males. Thus in this first group the male rostrum of *proboscideus* measures three-fifths the length of the body, and in the others except *longidens* only slightly more than half is the rule. In cases where only one sex was available for description, the writer has exercised his own judgment as to the group to which each belongs, but in one species (*albidus*), where the male rostrum is nearly as long as the body, no conjecture is hazarded.

THE GENUS *Curculio* L.

Curculio Linnaeus, Carolus, *Systema Naturae*, 10th ed., 1758, pp. 377-386.

Balaninus Germar, *Mag. der Ent.*, pp. 339, 341, 1817.

Mouthparts small, mandibles vertical, gular peduncle very long and narrow. Rostrum very long and slender. Antennae very long

and slender, inserted on the rostrum usually anterior to the middle (♂) and posterior to the middle (♀); funicle 7-jointed; first joint longer, exceptionally shorter than second, outer joints usually gradually a little less elongate; club elongate oval, pointed annulated and pubescent. Eyes large, nearly flat, nearly circular in outline and finely granulated. Prothorax rather long in front of coxae, which are contiguous; broadly emarginate anteriorly, without postocular lobes; pronotum rapidly narrowed anteriorly, sides usually subparallel in basal half, base slightly bisinuate. Scutellum distinct. Elytra wide at base narrowed posteriorly, apices separately rounded; humeri not prominent; pygidium more or less exposed in male. Mesothoracic epimera attaining widely the base of prothorax, and truncating the humeral outline of elytra; metathoracic episterna narrow, dilated anteriorly. First ventral segment longer than second, and closely united with it; others subequal in length. Middle coxae moderately distant, posterior coxae widely distant, not attaining the elytral margin. Legs long, femora clavate and strongly dentate, tooth usually bearing a denticle; tibiae slender, usually sinuate; truncate at tip, not mucronate; tarsi dilated, claws divergent, bifid.²

THE ROSTRUM

The genus *Curculio*, as has been stated, comprises species with exceedingly long rostra or beaks, especially highly developed in the female. Indeed, the average length is greater than in any other group of North American Rhynchophora. Naturally, valuable characters are to be found in this organ, such as its length, normal arcuation, and other structural characters. The length of the rostrum as compared with that of the entire body is an excellent character, especially valuable for division into groups. As a general rule, the female rostrum is considerably longer and more slender than that of the male, and not infrequently approaches a straight line, while that of the other sex is inclined to be rather uniformly arcuate. In certain of the smaller species there is little difference in the sexes.

In statements of dimensions here used the measurements are from selected normal specimens, and the length of the rostra is from base to apex, including the mandibles, by the chord of the arc, since it is practically impossible, except in a few species, for the average

² Adapted from "Rhynchophora of America," LeConte and Horn, 1876, p. 322.

student to make actual measurements of an imaginary extended arcuate rostrum. The length of the body is measured from the frons of the head to the apex of the elytra or pygidium, not from the apex of the prothorax to that of the elytra.

In statements which are made in the tables and in descriptions regarding the conformation of the base of the rostrum, such as "proceeding abruptly from the head" or "continuous with the frons," it should be understood that this description is as viewed from the side.

The mouthparts are small and the mandibles are unusually short, although in certain species twice the usual size. They are vertical in that they are incapable of motion laterally, being restricted to movement in a lateral plane, acting like scissors in which both edges are acute. Their inner edge is more convexly curved than the outer, so that in many specimens the points appear to be more or less divergent. The teeth, in fact, appear much different from those of other Curculionidae which have been studied by the writer.

THE ANTENNAE

The antennal characters afford means for the classification of only a few species, but are of much less value than the character of the rostra and the femoral teeth. The antennae of the female, because of the greater length of the funicular joints, are more pronounced, hence more easily studied.

The most striking instance of differences in the antennal structure is seen in *proboscideus* in which the second funicular joint is distinctly longer, nearly one-third, than the first joint; joints 1 and 3 being subequal. In no other species of our fauna is this character constant. In most species, as a rule, the first funicular joint is at least one-fourth longer than the second, and the second is usually distinctly longer, sometimes about one-fourth, than the third. Exceptionally, however, as in certain aberrant individuals—*e.g.*, in *rectus*—the first funicular joint is scarcely longer than the second, and in several species the second joint is scarcely longer than the third. The remaining joints 4 to 7 are usually subequal or grow very gradually smaller distally and are more or less inconstant as regards their comparative length. The antennal club is elongate fusiform, acute, annulated and finely pubescent. It presents little of apparent value in classification. The scape extends toward and nearly or quite to the eye. The eyes are quite similar in the various species. In the female, as a rule, the antennae are

inserted distinctly posterior to the middle on the rostrum, in the long-beaked species in the proximal fourth or third; in the male, at, or before, or exceptionally a little posterior to the middle in most species. There are, however, exceptions; *e.g.*, in the male *pardalis* the antennae are placed well behind the middle.

The male antennae differ from those of the female also by their distinctly shorter funicular joints and by the comparatively longer scape. Otherwise, their structure is very similar.

Knowing the variability in the lengths of the funicular joints, a large series of *rectus* was examined, with the finding of two males in which the first two joints were subequal, agreeing with *cuneatus* Cas. Another series showed the second joint only a little shorter than the first, corresponding to the description of *sparsellus* Cas. Naturally, there are variations between these. Such variations occur in several species of *Curculio* but are unusual and somewhat perplexing, since there are no other obvious structural characters separating them from normal types and there is no difference in distribution.

THE LEGS

The legs are extremely long and slender, the femora are more or less strongly clavate and each bears a single, usually prominent, distal tooth, which generally terminates in an acute denticle. The tibiae are slender, more or less strongly bisinuate, truncate at the apex and mucronate. The tarsi are dilated, the third joint very widely bifid and provided with a dense hairy pad. The claws are divergent, strongly incurved, with an inner tooth. Somewhat extreme variation is exhibited in the length of the legs. Some are noticeably long, others comparatively short. The difference in the size of the femora and the size and shape of the femoral tooth offer excellent characters by which the species may be grouped. In species in which the rostrum is of about the same length as that of the body, there is great divergence. As examples, in *orthorhynchus* the femoral club is small and the teeth scarcely more than denticles, while in *caryae* and *nasicus* the club is much larger and the teeth strong and conspicuous. In *rectus* the club and teeth are more prominent than in *orthorhynchus* but not so strong as in the last two mentioned. In *macrodon*, *ruficristatus*, and *longidens* the femoral teeth attain the maximum of development, becoming strongly prolonged and with acute denticles.

THE VENTRAL SURFACE

The first ventral segment is much longer than the second, and is nearly connate with it at the middle. The second segment is distinctly longer and slightly narrower than the third, from which it is widely separated. The third and fourth segments are subequal in length, while the fifth is subdeltoid, generally with a central depression or concavity of varying extent. The middle coxae are moderately distant, and the posterior coxae are widely distant, not attaining the elytral margin.

In the female the abdomen is more convex and distended than in the male; the first and a portion of the second segment are slightly convex or nearly flat near the middle. The fifth abdominal is more or less concave at the middle and is uniformly clothed. In the male the first is usually more or less concave and the fifth may be either flat or widely concave, very frequently terminating in a semi-denuded area at the extreme apex, while the pygidium usually terminates in a tuft of hairs at each side or, exceptionally, at the middle. The abdominal and pygidial characters, together with the rostrum and point of insertion of the antennae, serve as a means of distinguishing the sexes where other characters are difficult to find.

VESTITURE

Before considering the subject of the vestiture of our native species of *Curculio*, it would be well to quote from Horn who wrote in 1873:³ "The marked uniformity of vestiture of many of the species renders it extremely difficult to separate them" by that character, a statement which is only too true of the average cabinet specimen, but does not hold for reared, unrubbed, or freshly captured material. The predominant color of vestiture of our native species is ocherous, called also ochraceous, or clay-like, or more or less yellowish buff or pale yellow brown. Others of our American forms are more distinctly yellow to golden yellow, with gray of different shades as the only other ground color.⁴ The vestiture of all of our species is, in the main, if not entirely composed of minute, prostrate and more or less hair-like, scales or squamules, and the arrangement of this squamulose covering of the body usually follows a nearly uniform pattern, more variable on the elytra as

³ Horn, G. H., Proc. Amer. Phil. Soc., 1873, p. 457.

⁴ Some of the European and other exotic species are decidedly rufous; and *villosus* Fab. and *crux* Fab. are black with white elytral fascia.

regards color. It is as a general rule densest and of coarsest texture at the sides and on the elytra, much longer on the prothorax, shorter on the abdominal segments, and very fine and slender on the legs. The vestiture in fresh material normally covers the head and is usually coarser and denser between the eyes, and in the males of the short-beaked series this covering sometimes extends sparsely about a third of the length from the base to the point of insertion of the antennae. On the disc of the pronotum, especially noticeable in the larger ochreous or yellow species, the long, hair-like squamules are directed toward the middle, at which point the color is paler in the form of a lineal area, extending from base to apex and appearing slightly elevated; each side of this pale line is a larger darker area, and at the sides of the disc a paler area subequal in width to the dark one. On the elytra the vestiture is, in the majority of our species, more or less spotted, these spots usually being arranged in more or less indistinct transverse fasciae, three or four in number (see fig. 1).⁵

INDIVIDUAL VARIATION

After what has been said in regard to the individual diversity of arcuation in the female antennae of *Curculio*, especially in such species as *auriger*, mention should be made in regard to variation constituting in many cases habitus or facies. This aspect is most apparent in the general form or appearance of a given zoological species and it is borne out by the experience of those who have conducted careful rearing in *Curculio*, as have Brooks and the writer, and who have exercised judgment based on experience in the selection and description of a species. There is in *Curculio* extreme variation in many species reared from the same locality and from the same species of *Quercus* or other food tree. Among such species, *rectus*, *pardalis* and *longidens* form striking examples, while others, such as *caryae* and *proboscideus*, are subject to similar

⁵ The species of *Curculio*, it should be mentioned, like the plum curculio and many others, are of sluggish habits but have long, well-developed and serviceable wings. The character of these would warrant the conclusion that they are not only capable of long-sustained flight but that they fly longer distances than is usual in the Curculionidae. At the time of the first invasion of the boll weevil from Mexico, large numbers, especially of *victoriensis* and *parvidens*, were captured at electric lights.

diversity.⁶ In the remarks on synonymy which follow in regard to different species, points like the above have been borne in mind. Merely because a specimen is stouter or more slender or has wider elytra, is a little more flat, or more nearly cylindrical than others, or has a little shorter or a little longer rostrum or antenna with different curvature, it can not be considered a species, in this genus, unless there are other constant characters of a more convincing nature, such as sexual ones.

Further, the writer believes that practically every species named in this work as such will eventually be proved, by rearing and biologic study, along the line so ably started by Mr. Fred E. Brooks,⁷ and in less detail by Doctor Hamilton, Mrs. Blake and the writer, to be a zoological species.

LITERATURE

For the proper understanding of a genus, one must necessarily study sooner or later, as in everything of like nature, by beginning at the ground and working upwards, a method which necessitates an interpretation of the descriptions of the earlier authors. In the old Melsheimer Catalogue,⁸ published in 1806, one species is listed, *Curculio nucum* L., a European form not known to occur in this country. Say⁹ recognized five species as follows: *Balaninus proboscideus* Fab., our largest known species, and *nasicus* Say, accepted by coleopterists as a fasciate form having the female rostrum as long as the body. Judging by the description alone and what we know of many of Say's descriptions, this might apply equally to *strictus* Casey, since it reads: "Rostrum *not* so long as the body or hardly longer"; also *rectus* Say, formerly known as *quercus* Horn, and *nasutus* Say, the latter designated by Horn and others as a synonym of *nasicus*, but perhaps the male of *proboscideus*. Since this name is sunk in synonymy and the types are not known,

⁶ Such variation is so striking in this genus as to have resulted in the creation of a superfluity of synonyms. Synonyms of this nature might be traditional, "book," collection or commercial names, the last class including certain dogs and other domestic animals.

⁷ Bul. 128, W. Va. Agr. Exp. Sta., March, 1910.

⁸ Melsheimer, F. V., Catal. Ins. Penna., Hanover, 1806.

⁹ Say, Thomas, Descr. North Amer. Cureul., etc., July, 1831, p. 279.

further discussion is superfluous. The fifth is *B. constrictus* (= *Desmoris constrictus* Say).

In Harris's first catalogue of Coleoptera, published in 1838,¹⁰ *rectus* is mentioned as being found in the vicinity of hazel bushes, leading Harris to believe that it inhabited the nut of that shrub, from which fact it would seem evident that he had in mind the species subsequently described by Blanchard as *obtusus*. In his later treatise¹¹ he mentions a single species, *nasicus* Say, and describes it as having the snout longer than the whole body, and this identification is probably correct. The species, however, which he found paired upon the hazelnut tree in July is again, barring an improbable accidental occurrence, *obtusus*. *B. nasicus* Say (of authors) again is a composite, especially as the statement has been made that it infests not only acorns but hazelnuts as well.

In Dr. Horn's table, issued in 1873, only six species are treated, two being described as new. Of these *quercus*, according to the nearly simultaneous conclusion of Casey and the writer (unpublished), is *rectus* Say, while Horn's "*rectus* Say" was mentioned at the same time as not that species but *auriger* Cas. *B. "uniformis,"* inasmuch as it contains brief descriptions of three varieties and is stated to occur from Canada to Texas and Kansas as well as in California and Oregon, is a composite, as proved by the description and specimens identified by various authorities, and contained probably all forms which Horn had the opportunity of studying that were not included in the consideration of the other species in his paper. The type is from California.

Location of types: *B. obtusus* Blanch., type in the Museum of Comparative Zoology at Cambridge, Mass., seen by the writer; *nasicus* Say, *rectus* Say, and *nasutus* Say, types believed to have been destroyed by fire; *uniformis*, type at the Museum of Comparative Zoology, specimens seen by the writer, compared by both Fall and Blanchard; *caryae* Horn, type in the Philadelphia Academy of Sciences, well known and easily identified; *confusor*, types in Carnegie Museum at Pittsburgh, Pa., seen by the writer.

DISTRIBUTION

The species of *Curculio* occurring within the confines of our American faunal regions north of Mexico are so far as known native

¹⁰ Harris, T. W., in Hitchcock's *Economical Geology of Mass.*, p. 83.

¹¹ *Insects Injurious to Vegetation*, 1862 ed., p. 74.

to this country. They are well distributed throughout the United States and the arable portions of Canada, and are apparently rare in Mexico and not so abundant on the Pacific Coast. Four species only have thus far been noted as occurring in California, but in Texas, Arizona and New Mexico there are many species, considering the scarcity of material from Mexico. In Texas alone a dozen or more species occur and a like number in Arizona and New Mexico combined, and a similar number in the faunal region of the District of Columbia.

In the preparation of this paper the writer had access to the United States National Museum collection, including that of Col. Thos. L. Casey, who described several species of *Curculio*, and of an accessory collection of the Bureau of Entomology, which latter has been greatly augmented by accumulations received from agents and correspondents of the Bureau, including many specimens reared from acorns, obtained for the purpose. The writer is especially indebted for material to Fred E. Brooks, Bureau of Entomology, to L. L. Buchanan, A. B. Champlain, W. T. Davis, H. C. Fall, C. A. Frost, L. G. Gentner, Dr. C. P. Gillette, Dr. H. P. Löding, C. H. Popenoe, Dr. E. C. Van Dyke, Prof. H. B. Hungerford, Prof. H. F. Wickham, Major Wirt Robinson, Prof. Franklin D. Sherman, and the late H. W. Wenzel, as well as others who will be mentioned in the discussion of species. Through the kindness of Dr. W. J. Holland, the writer consulted the collection at the Carnegie Institution, Pittsburgh, Pa.; through Dr. J. McDunnough, he has studied the collection of the National Museum of Canada, and through Dr. Nathan Banks material from the Museum of Comparative Zoology. The writer also wishes to acknowledge the assistance of Mrs. D. H. Blake in the rearing and preparation of specimens for study.

TABLE OF GROUPS

A. Rostrum ♀ nearly as long (five-sixths or more) or longer than body.

Femora strongly clavate and dentate, teeth with obtuse re-entrant angles.

Rostrum ♂ ♀ continuous with frons1. *proboscideus* group

Rostrum ♂ ♀ proceeding abruptly from head; of ♂ usually more than half as long as head.....2. *nasicus* group

Femora feebly dentate and clavate, rostrum ♀ nearly straight, hair-

- like; rostrum ♂ scarcely one-half
as long as body.....3. *orthorhynchus* group
- B. Rostrum ♀ more than half to four-
fifths as long as body; of ♂ one-
half to two-thirds.
- Rostrum ♀ three-fourths to four-
fifths as long as body.....4. *pardalis* group
- Rostrum ♀ one-half to three-fifths
as long as body.....5. *q. griseae* group
- Rostrum ♂ nearly as long as that
of ♀, of latter less than to
fully one-half as long as body.
- Rostrum parallel or subparallel
with frons6. *obtusius* group
- Rostrum proceeding abruptly
from head7. *monticola* group

1. TABLE OF THE *proboscideus* GROUP

*Species with rostrum ♀ about as long as, or longer than, the body;
of ♂ more than one-half as long as body; ♂ ♀ continuous with
frons, strongly enlarged at base.*

- First funicular joint of antennae
shorter than second.
- Femoral club and teeth large;
Eastern U. S. 1. *proboscideus* Fab.
- First funicular joint of antennae
longer than second.
- Femoral club and teeth smaller;
Eastern U. S., Ariz., (?)..... 2. *auriger* Cas.

2. TABLE OF THE *nasicus* GROUP

Rostrum ♂ ♀ proceeding abruptly from head.

- a. Femoral club and teeth large, lat-
ter right-angular, not strongly
produced. Rostrum ♀ longer
than body.
- Rostrum ♀ distinctly arcuate.
Pygidium ♂ not cup-like.
- Rostrum ♀ strongly, subequally
arcuate. Vestiture scaly, with
2 distinct transverse pale
fasciae on elytra. Antennae
♂ inserted far in front of
middle; Eastern U. S., Tex. 3. *nasicus* Say

- Rostrum ♀ strongly arcuate only toward apex. Vestiture hair-like; elytra without fasciae. Antennae ♂ inserted at middle; Eastern U. S., Tex. 4. *caryae* Horn
- Rostrum ♀ nearly straight, abruptly recurved at apical 4th; very slender.
- Pygidium ♂ and ♀ cup-like. Elytra not or very feebly fasciate; Eastern U. S., Tex. 5. *rectus* Say
- b. Femoral club and teeth very large, latter strongly produced with prominent denticles.
- Vestiture of elytra short, alternately banded with light and dark brown.
- Form robust subcylindrical.
- Posterior femoral teeth about as long as anterior; Tex. 6. *macrodon* n. sp.
- Form deltoid, not cylindrical.
- Posterior femoral teeth distinctly shorter than anterior; Mass.—Fla., Tex. 7. *longidens* n. sp.
- Vestiture of elytra long, red, irregular, ♂ with strong tuft at apex; antennae ♂ inserted slightly behind middle; form elongate; Tex. 8. *ruficristatus* n. sp.

3. TABLE OF THE *orthorhynchus* GROUP

- Rostrum* ♀ slightly shorter than the body; femoral club and tooth small; reentrant angles obtuse.
- Rostrum* ♀ slender, hair-like, nearly straight; last one-seventh suddenly recurved; of ♂ less than one-half as long as body. Length 6.0–7.5 mm.; N. H.—Ala., Wis. 9. *orthorhynchus* Chttn.
- Rostrum* ♀ thicker, gradually strongly arcuate.
- Vestiture mainly ocherous, composed of long squamules.
- Elytral vestiture faintly dotted with slightly darker areas.

- Femora feebly dentate with denticles obsolete. Rostrum ♂ two-thirds as long as body. Length 6.0–7.0 mm.; Ariz. 10. *longinasus* n. sp.
- Elytral vestiture with several strongly alternate pale and dark fasciae.
- Femora rather strongly dentate; denticles nearly obsolete. Rostrum ♂ nearly three-fifths as long as body; length 6 mm.; Wis. 11. *multifasciatus* n. sp.
- Elytral vestiture strongly intermixed with dark brown areas, subfasciately arranged.
- Femora quite strongly dentate with denticles distinct and produced. Rostrum ♂ less than one-half as long as body. Length 4.5–5.5 mm.; So. Cal. 12. *pardus* n. sp.
- Vestiture mainly gray. Rostrum ♂ four-eighths to five-eighths as long as body.
- Slender, convex; vestiture dense dull gray, strongly intermixed with brownish gray. Elytral intervals flat. Antennae ♂ inserted just behind middle. Length 5.8–6.0 mm.; Ariz. 13. *gracilis* n. sp.
- Robust, depressed; vestiture sparse, dark gray. Elytral intervals convex. Antennae ♂ inserted at middle. Length 6.3–6.6 mm.; Western Tex. 14. *wenzeli* n. sp.

4. TABLE OF THE *pardalis* GROUP

Rostrum ♀ *three-fourths to four-fifths as long as the body. Femora strongly clavate and dentate;*

teeth deltoid with outer edge forming a right angle; denticles prominent.

Rostrum ♂ ♀ distinctly enlarged at base, strongly at apex, stout.

Vestiture bright ochereous or yellow brown; elytra strongly mottled with small darker brown spots. Rostrum ♂ nearly two-thirds as long as body; antennae ♂ inserted well behind middle of rostrum; Eastern U. S., Tex.

15. *pardalis* Chttm.

Rostrum ♂ ♀ somewhat enlarged at base, not at apex.

Vestiture gray or pale ochereous; elytra lightly spotted with pale brown. Rostrum ♂ one-half as long as body; antennae ♂ inserted at middle of rostrum; Tex., Kans., Ala., S. C.

16. *victoriensis* Chttm.

Rostrum ♀ scarcely enlarged at base, not at apex, more slender.

Vestiture pale gray; elytra with small brown or fuscous spots. Rostrum ♂ one-half as long as body, proceeding abruptly from head; antennae inserted in front of middle. Body slender. Length 5.0–6.5 mm.; N. Mex.

17. *emarginatus* n. sp.

Vestiture pale ochereous to reddish; elytra irregularly spotted and fasciate. Rostrum ♂ more than one-half as long as body, subparallel with frons; antennae generally inserted about at middle. Body robust. Length 6.0–8.0 mm.; N. J.—N. C.—N. Mex., Utah, Tex.

18. *strictus* Cas.

5. TABLE OF THE *q. griseae* GROUP

Rostrum ♀ more than one-half to three-fifths as long as the body.

Femoral club, teeth and denticles somewhat strongly developed.

- Antennae ♀ inserted behind basal fourth.
- Vestiture yellow-brown on dorsum, variegated with red-brown on elytra; lower surface silvery gray. Robust; Ariz.
- Vestiture mostly ochreous yellow.
- Anterior femoral tooth large, posterior one close to apex.
- Abdomen ♂ with double concavity; Eastern U. S., S. Dak.
- Antennae ♀ inserted two-fifths from base.
- Anterior femoral tooth small, posterior large, distant from apex. Abdomen ♂ without double concavity; Cal.—Ore., Ut., B. C.
- Femoral club, teeth and denticles more feebly developed.
- Antennae ♀ inserted nearly one-fifth from base of rostrum; of ♂ well behind middle. Rostrum ♀ thick, three-fifths as long as body, strongly arcuate; of ♂ one-half as long as body. Femora moderately clavate; Gulf States, N. C.
- Antennae ♀ inserted not less than one-fourth from base, of ♂ about at middle. Rostrum ♀ slender, nearly straight from base, distinctly arcuate at apex; of ♂ more than one-half as long as body. Legs slender; Eastern U. S., Tex.
- Antennae ♀ inserted near basal third.
- Vestiture sparse, whitish gray, covering larger brown squamules, pale silvery gray be-
19. *q. griseae* Chtttn.
20. *confusor* Ham.
21. *uniformis* Lec.
22. *parvidens* Chtttn.
23. *baculi* Chtttn.

- low, not spotted on elytra.
 Body slender; Cal. 24. *cervulinus* n. sp.
 Vestiture dense, bright ochereous,
 lightly spotted on elytra,
 much paler below. Rostrum
 δ three-fifths as long as body,
 strongly dilated at apex; an-
 tennae δ placed well behind
 middle. Form robust; Ariz. ... 25. *undulatus* Cas.
 Vestiture nearly uniform light
 brown.
 Rostrum comparatively slen-
 der, moderately arcuate; of
 δ more than one-half as
 long as body; antennae δ
 inserted about at middle;
 Tex. 26. *microdon* n. sp.
 Rostrum thick, somewhat
 strongly arcuate; antennae
 δ inserted far behind mid-
 dle; N. Mex. 26^a. *microdon rectitibialis*
 n. var.

6. TABLE OF THE *obtusus* GROUP

Rostrum ♀ about one-half as long as, or
 shorter than body, thick; parallel
 or nearly parallel (view from
 side) with frons. Vestiture mainly
 ochereous or yellow.

Dorsum strongly convex.

Rostrum ♀ one-half as long as
 body; 5th ventral ♀ feebly
 concave.

Rostrum moderately stout, same
 length in ♀ and ♂.

Antennae ♂ inserted at mid-
 dle of rostrum. Elytra and
 abdomen very strongly con-
 vex; elytra wide with promi-
 nent humeri; Eastern U. S.
 —Can., Tex.

27. *obtusus* Blanch.

Antennae ♂ inserted nearly
 three-fifths from base. Ely-
 tra and abdomen not so

- strongly convex; elytra narrower, humeri not prominent; Ia., Wis., Col., Can. 28. *numenius* n. sp.
- Dorsum moderately convex.
- Rostrum very thick, not more than half as long as body.
- Rostrum ♂ and ♀ of subequal length.
- Antennal scape as long as first 4 funicular joints.
- Rostrum ♀ nearly straight in basal three-fourths, rather abruptly arcuate at apex, distinctly carinate; N. Mex., Can. 29. *funicularis* n. sp.
- Rostrum ♂ shorter than in ♀, two-fifths to one-half as long as body.
- Rostrum ♀ feebly sub-uniformly arcuate, feebly dilated at apex.
- Antennal scape ♀ shorter than first 4 funicular joints.
- Head and eyes large, prothorax as long as wide, posterior legs extending beyond elytra; N. Y.—N. C.—Wis., Tex. 30. *iowensis* Cas.
- Head and eyes smaller, prothorax not as long as wide, posterior legs not extending beyond elytra; Ariz. 31. *ibis* n. sp.
- Dorsum considerably depressed.
- Rostrum moderately thick, more than one-half as long as body; humeri not prominent; Can. 32. *exilis* n. sp.

7. TABLE OF THE *monticola* GROUP

Rostrum ♀ one-half to fully as long as body, proceeding more or less abruptly from the head (lateral view).

Form oblong oval, about twice as long as wide.

Vestiture yellow or ochereous; rostrum thick, feebly arcuate in ♂.

Prothorax strongly convex.

Rostrum ♀ slightly more than one-half as long as body; of ♂ slightly less.

Elytra and abdomen depressed. Femora abruptly clavate, teeth blunt, denticles minute; Western Tex., N. Mex.

33. *monticola* Cas.

Rostrum ♀ and ♂ one-half as long as body, very thick, feebly uniformly arcuate; 5th ventral ♀ lightly impressed at middle; vestiture ochereous gray; Ariz.

34. *crassirostris* n. sp.

Rostrum ♀ less than one-half as long as body; thick; 5th ventral ♀ longitudinally deeply concave at middle.

Vestiture dense golden yellow or paler; Cal.

35. *aurivestis* n. sp.

Prothorax and elytra depressed.

Rostrum (♀) comparatively slender; antennae inserted far behind middle.

Vestiture sparse, fulvous; elytra with red-brown fasciae; Cal.

36. *brevinasus* n. sp.

Vestiture gray; rostrum slender, more strongly arcuate in ♂.

Rostrum ♀ nearly straight. 5th ventral broadly indented at middle third.

Elytra wide, rounded at apex;
striae fine and shallow; intervals wide, nearly flat, feebly elevated. Vestiture dark gray, mostly dense and composed of short scales;
N. Mex.

37. *nanulus* Cas.

Elytra narrow, acuminate to apex; striae wide and deep; intervals narrow, convex, strongly elevated. Vestiture pale gray, mostly sparse, composed of comparatively hair-like scales;
Western Tex.

38. *striatus* n. sp.

Form very robust, less than twice as long as wide.

Subrhomboidal; prothorax short, distinctly tubulate at apex; elytral striae deep, strongly punctate; femora with minute denticles but without teeth; Fla.

39. *humeralis* Cas.

1. *Curculio proboscideus* Fab. (Fig. 2)

Curculio proboscideus Fab., Syst. Ent., 1775, p. 142.

♀ *Balaninus caryatrypes* Boh., in Schönh. Gen. Cure., vol. VII, p. 276, 1845; Horn, Proc. Am. Phil. Soc., 1873, p. 458.

♂ *Balaninus hariolus* Cas., Can. Ent., XLII, 1910, p. 114.

♀ *Balaninus cylindricollis* Cas., l. c., p. 115.

Elongate elliptical in outline, body and rostrum piceous, legs and antennae dark brown. Vestiture dense, varying from golden yellow or ochereous to gray with or without dark brown spots or fasciae on elytra; squamules very fine and short with the exception of those on the prothorax which are hair-like.

Rostrum ♀ nearly one-fourth longer than entire body,¹² at base subparallel with the frons, much thickened, narrowing toward apex; from point of insertion of antennae subuniform in width, nearly straight in the basal half, increasingly arcuate in the apical third, not enlarged at apex. Antennae inserted in front of basal fourth, second funicular

¹² Measured by the chord of the arc from the frons to the apex of the pygidium.

joint longer than first. Mandibles small. Prothorax considerably longer than wide, tubular at apex. Elytra elongate subovate, acuminate at apex, moderately wider than the prothorax. Femora long, strongly clavate and dentate, reentrant angles of teeth strongly obtuse; denticles large and prominent, subacutely produced. Last ventral segment broadly and deeply concave at middle.

Rostrum ♂ about three-fifths as long as the body, strongly arcuate. Last ventral segment concave at the middle. Pygidium with a dense brush of golden hairs.

Length ♀ 8.0–13.0 mm.; width 3.3–4.0 mm.; length of rostrum ♀ 12.0–16.0 mm. Length ♂ 6.5–11.0 mm.; width 2.5–4.0 mm.; length of rostrum ♂ 5.0–7.0 mm.

Type Boreal America. The known distribution extends from Massachusetts to North Carolina and Tennessee and westward to Kansas.

Distinct from all other species by the antennal structure. It is the largest *Curculio* in our fauna, the rostrum attaining a length in the male of 7 millimeters and in the female 16 millimeters. The expression by various writers that the female rostrum is twice as long as the body evidently is based on the measurement of the body minus the thorax. A large series shows extreme variation in size, color and curvature of the rostrum. Among color variations are nearly uniform golden brown, ocher, gray, and bright brown mottling on the elytra. Some individuals are much more robust than others and depauperated specimens so closely resemble *auriger* that it is necessary to examine the antennae to determine the species.

Type of *caryatrypes* ♀ North America; ♂ unknown; of *hariolus* (♂) unknown, stated to be probably Indiana; described merely as smaller, more slender and more acuminate with shorter legs and beak. Type of *cylindricollis* ♀, Tennessee; differs from other ♀ *proboscideus* simply in being much smaller, more slender, with vestiture uniform tawny yellow, the shorter, nearly straight rostrum and the apically constricted prothorax. Further remarks on synonymy would be practically superfluous, since so much is in doubt (see Gyllenhal, in Schönh., Gen. et Spec. Cure. 1836, p. 375).

Breeds in the fruit of chestnut and chinquapin, to which it is quite destructive.

2. *Curculio auriger* Cas. (Fig. 3)

Balaninus auriger Casey, Can. Ent., vol. XLII, 1910, p. 117.

Balaninus rectus Say, of Horn (nec Say)

Horn, Proc. Am. Phil. Soc., 1873, p. 459. Casey in part.

♂ *Balaninus auriger mollis* Cas., l. c., p. 118.

♀ *Balaninus strigosus* Cas., l. c., p. 118.

♂ *Balaninus algonquinus* Cas., l. c., p. 118.

♀ *Balaninus acuminatus* Cas., l. c., p. 119.

Balaninus setosicornis Cas., l. c., p. 119.

Balaninus macilentus Cas., l. c., p. 120.

♂ *Balaninus perexilis* Cas., l. c., p. 120.

Slender, convex; piceous-black, antennae and legs rufo-piceous to pale red. Vestiture dense, variegated golden yellow; scales fine and short, hair-like on the prothorax with a wide dark brown area each side of the middle of the prothorax and with smaller, irregular, dark brown, subtransverse fasciae on the elytra.

Rostrum ♀ usually distinctly longer than the body, slender, subparallel with the frons, moderately enlarged at the base, scarcely at the apex; strongly and nearly uniformly but somewhat variably arcuate. Antennae inserted behind the basal third; scape longer than the succeeding three funicular joints together, 1 one-third longer than 2, 2 slightly longer than 3. Prothorax a little longer than wide. Femora moderately clavate and somewhat feebly dentate, with denticles large and strongly produced; reentrant angles obtusely rounded. Fifth ventral segment very widely and deeply concave.

Rostrum ♂ about half as long as the body, thicker than in ♀, strongly arcuate, much enlarged at base. Femoral tooth less strongly developed than in ♀. Antennae inserted about at, or just in front of, the middle. Last three ventral segments gradually ascending, the fifth narrow.

Length ♀ 4.5–8.0 mm.; width 1.8–3.0 mm.; length of rostrum ♀ 4.5–9.0 mm. Length ♂ 4.5–6.2 mm.; width 1.8–2.5 mm.; length of rostrum ♂ 2.2–3.5 mm.

Distributed from Canada to North Carolina and westward to Ohio and Tennessee. "Ariz." type locality doubtful.

Readily separable from *proboscideus* by the characters furnished in the table and from all others by the female characters.

Of the synonyms indicated, it should be stated that *auriger* "Arizona" antedates the others and must, therefore, be accepted.

auriger mollis subsp. (♂), is without type locality, stated to be "probably from Arizona."

strigosus ♀, Arizona, compared with *auriger*, "legs shorter, especially the female peduncle."

algonquinus ♂ unique, from Indiana. Fifth ventral (♂) feebly impressed and scantily clad, gradually feebly deflexed apically, apex feebly sinuate, cleft between segments 2 and 3 very large. Said to be "distinguished from any other of the eastern forms of this group by its shorter and relatively stouter form." It might further be stated of this aberration that it is nearly immaculate and subuniformly dark golden yellow with reddish rostrum.

acuminatus ♀ unique, without definite locality, "probably Arizona or Colorado." Stated to be "readily distinguishable from *auriger* by its much longer beak, more elongate prothorax" and "fifth ventral more obtuse and more concave."

setosicornis ♂, ♀ "West Virginia." Type locality not indicated but probably from Blacksburgh, (Fred E. Brooks).

macilentus ♂, ♀ West Virginia. "Same as the preceding." The writer received a set ♂ and ♀ of these specimens at the same time from the same source.

B. perexilis ♂, New Jersey, is simply a depauperated male.

B. quercus must necessarily be briefly mentioned, since the name was not dropped by Casey, either in his work (l. c.) or in his collection. In the former the differences between *quercus* and others are pointed out. Finally to clarify the atmosphere, if possible, it should be repeated that in the opinion of the writer, Leng and others, Horn's *quercus* of collections is, by the original description, positively *rectus* Say.

The species breeds in the fruit of the chestnut and chinquapin and, with the preceding, is very destructive. The writer has seen specimens labeled "bred from acorns" from Arizona, but is skeptical both as to food plant and locality.

3. *Curculio nasicus* Say (Figs. 10, 11)

Balaninus nasicus Say, Curcul. N. A., 1831, p. 16, Lec. ed., v. I, p. 279; Gyllenhal, in Schönh., Gen. Curc., v. III, p. 377, 1836; Horn, Proc. Am. Phil. Soc., 1873, p. 460, 461.

Curculio nucum (Melsh. Cat. ♂ [teste Say]).

? *Balaninus nasutus* Say, l. c.

? *Balaninus rostratus* Gyllenhal, l. c., p. 374.

? *Balaninus sparsus* Gyllenhal, l. c., p. 379.

♂ *Balaninus auctus* Casey, Can. Ent., 1910, p. 124.

Elongate oval, piceous throughout, or rostrum, legs and antennae rufous. Vestiture very dense, composed of short fine squamules becoming sparse and hair-like on disk of prothorax and legs; gray-ocher to reddish ocher, much darker

on dorsum with a distinct pale fascia one-third from apex and a less distinct fascia at basal third, usually interrupted at middle.

Rostrum ♀ slightly longer than, or as long as, body, slender, strongly nearly uniformly arcuate, proceeding abruptly from head, not thickened at either extremity, punctulate basally. Antennae inserted behind basal third; scape as long as first 4 funicular joints, first funicular one-third longer than 2, second one-third longer than 3. Mandibles very small. Prothorax about as wide as long, moderately arcuate at sides. Elytra subtriangular, humeral angles prominent, scarcely arcuate at sides, rapidly acuminate to apex. Legs long, femora very strongly clavate; teeth very large, reentrant angles nearly right angles, distal edge more than half as long as width of club, sinuous, produced a little apically with small denticle. Tibiae strongly sinuous, especially posterior pair. Fifth ventral female moderately concave at middle.

Rostrum ♂ a little more than half as long as body, more strongly arcuate in distal half, proceeding less abruptly from head, somewhat feebly enlarged basally, gradually decreasing in diameter to apex which is slightly enlarged. Antennae inserted well in front of middle, scape as long as first $5\frac{1}{2}$ funicular joints. Fifth ventral with large feebly concave semi-denuded area at apex; pygidium with long orange hairs.

Length ♀ 6.0–8.5 mm.; width 2.7–4.0 mm.; length of rostrum ♀ 7.0–8.8 mm. Length of rostrum ♂ 2.5–4.5 mm.

In its restricted sense, omitting *strictus* with which it has been generally confounded, this species has a wide distribution. Specimens have been seen by the writer from exact localities in Vermont, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, District of Columbia, Maryland, Virginia, West Virginia, North Carolina, Illinois, Michigan, Iowa, and Wisconsin; East Ontario; Aylmer, Quebec; and Ottawa, Canada. It occurs more commonly northward and is somewhat rarely found in the more southern localities.

Recorded by F. E. Brooks and Doctor John Hamilton as breeding in acorns of *Quercus alba*, *prinus*, *rubra* and *coccinea*; also collected in numbers on *Q. ilicifolia*.

The synonymy of *nasicus* is for the most part doubtful. *Curculio nucum*, a common European form, listed as occurring in Pennsylvania, is naturally a mistake. In *B. nasutus* (type ♂ ?

Penna.) no specific differences are given to separate it from *B. rostratus* ♂, ♀; said by its describer to be synonymous with *nasutus* Say. *B. auctus* ♂, however, is nearly typical of *nasicus* as here considered.

4. *Curculio caryae* Horn (Fig. 9)

Balaninus caryae Horn, Proc. Am. Phil. Soc., 1873, p. 460.

Moderately robust ovate, convex; rufo-piceous. Vestiture very dense dull brown to ochreous, composed of short, fine scales, coarser on elytra, hair-like on prothorax and legs, the latter nearly completely covered.

Rostrum ♀ a little longer than body, proceeding abruptly from head, somewhat thick, especially at base and less so at apex, straight in basal half to three-fourths, thence strongly recurved to apex. Antennae inserted behind basal third. Scape a little longer than first four funicular joints together; first funicular one-fourth wider than 2, 2 nearly one-fourth wider than 3. Prothorax about as wide as long. Femora strongly clavate; teeth large with reentrant angle forming a right angle, sinuous on distal face; denticles prominent, acutely produced. Fifth ventral narrowly deeply concave.

Rostrum ♂ five-eighths as long as body, a little more enlarged at the extremities than in ♀; basal two-thirds nearly straight, apical third suddenly or moderately recurved. Prothorax as wide as, or wider than long.

Length ♀ 8.0–11.0 mm.; width 4.0–5.0 mm.; length of rostrum ♀ 8.5–13.2 mm. Length ♂ 7.0–9.5 mm.; width 3.2–4.0 mm.; length of rostrum ♂ 4.3–5.1 mm.

Ipswich, Mass. (D. H. Blake); New York, Brooklyn, N. Y. (type); St. Vincent, Colemanville, Singlestown, Pa. (V. S. Fisher); New Richmond, Nicholasville, Cincinnati, Ohio; Indiana; Hancock, Md. (F. R. Cole); Holly Springs, Starkville, Miss.; Canadian, Okla.; Nashville, Tenn.; Little Rock, Ark. (J. K. Thibault); Georgia; Texas.

This species, in point of size and length of rostrum, is second only to *proboscideus*. It is quite distinctive, separable by the characters defined in the table.

It infests hickory and pecan and is injurious to both, especially to the latter, whence its names of pecan curculio and *Curculio caryae*.

5. *Curculio rectus* Say (Fig. 12)

Balaninus rectus Say, *Cureul.*, 1831, p. 16, *Compl. Writings*, v. I, p. 279; Casey, *Can. Ent.*, v. XLII, 1910, pp. 116, 117; Leng, *Rhynch. N. E. Am.*, 1916, p. 266.

Balaninus rectirostris Gyll., in Schoenh., *Gen. Cure.*, v. III, 1836, p. 376.

? *Balaninus sayi* Gyll., l. c., p. 375.

Balaninus quercus Horn, *Contr. Curculionidae*, U. S. 1873, pp. 458, 459.

Balaninus cuneatus Cas., l. c., pp. 115, 116.

Balaninus quercus sparsellus Cas. subsp., l. c., p. 116.

Slender, elliptical oval, nearly two and one-half times as long as wide, red brown, legs light brown. Vestiture composed of fine, short, dense squamules, nearly uniform yellow brown except on elytra, which is strongly and finely spotted with darker brown.

Rostrum ♀ distinctly longer than the body, very slender, of uniform diameter, proceeding abruptly from the head, nearly straight or feebly arcuate, somewhat suddenly recurved in apical fourth or fifth. Antennae inserted just in front of basal fifth; scape shorter than first three funicular joints; first funicular about one-third longer than 2, 2 about one-third longer than 3. Legs long; femora somewhat feebly clavate; teeth rather small, reentrant angles obtuse, denticles prominent. Fifth ventral segment feebly concave at middle. Pygidium terminating in a small cup-like concavity.

Rostrum ♂ about one-half as long as body, strongly, nearly uniformly arcuate; mandibles large. Antennae inserted about at basal third. First ventral broadly concave, fifth with partially denuded area in middle third. Pygidium terminating in a larger cup-like process, glabrous within, surrounded by long hairs.

Length ♀ 6.5–9.7 mm.; width 2.6–4.0 mm.; length rostrum ♀ 7–11 mm.; length rostrum ♂ 4–5 mm.

Occurs commonly from Massachusetts to Wisconsin and Colorado southward to Florida and Texas. Type locality, Pennsylvania; description indicates that it was drawn from the female.

The very slender and hair-like rostrum, distinctly longer than the body in the female, slender delicate antennae, and more especially the cup-like or excavated pygidial concavity present in both sexes and especially prominent in the male, distinguish this species from all others. This character of the female pygidium has hitherto

been overlooked. It is between one-fourth and one-third the size of the male process.

This species has been reared from a large proportion of the oaks growing within its range, including *Quercus rubra*, *coccinea*, *ilicifolia*, *velutina*, *nana*, *imbricaria*, *nigra*, *phellos*, *michauxii*, *marilandica*, *laurifolia*, *myrtifolia*, *brevifolia*, and *palustris*. For some reason it has not yet been found on *alba* and *prinus*, species of oaks little affected by the genus, but has been collected on *macrocarpa*. The synonym *cuneatus* ♂, Huntington, W. Va., differs from type only in a slight aberration in which the first two funicular joints are of equal length. Of *sparsellus* n. subsp., type ♂, N. J., the describer did not specify actual subspecific characters.

6. *Curculio macrodon* n. sp. (Fig. 6)

Elongate suboval, twice as long as wide, subcylindrical, deep brown, prothorax piceous, rostrum, antennae and legs rufous brown. Vestiture dense, ocherous brown, strongly banded with darker brown on elytra, squamules short and subparallel, much shorter and paler on ventral surface, hair-like on prothorax and legs.

Rostrum ♀ eight-ninths as long as the body, proceeding abruptly from the head, nearly uniform, slender, moderately and nearly uniformly arcuate, scarcely enlarged at apex, punctulate in basal half. Antennae inserted behind basal fourth, scape longer than first two funicular joints, first funicular nearly one-fourth longer than second, second fully one-fourth longer than third. Prothorax slightly transverse, sides subparallel in basal half, slightly tubulate apically. Elytra one-third wider than prothorax, one-fourth longer than wide, humeral angles not prominent, striae regular, rather deep and wide. Legs long; all femora very strongly clavate, posterior pair reaching slightly beyond apex of elytra; tooth of each very large and prominent, extending forward and downward beyond club ending in an acute point, distal edge strongly sinuous; denticle not distinct from tooth. Tibiae long, slender, sinuous. First and second abdominal segments broadly and feebly concave at middle, fifth moderately concave at middle.

Length ♀ 7.5 mm.; width 3.7 mm.; length of rostrum ♀ 6.5 mm. "Texas."

Type, ♀, Cat. No. 28,994, U. S. National Museum. Type unique.

7. *Curculio longidens* n. sp. (Figs. 7, 8)

Elongate subtriangularly ovate, twice as long as wide, dark rufous throughout, antennae lighter; vestiture sparse ochereous yellow and light brown; squamules very fine and short, much longer on prothorax and legs; elytra with three broad, light brown fasciae, sub-basal, medial and apical, the last broadest.

Rostrum ♀ nine-tenths as long as the body, proceeding abruptly from the head, moderately slender, of uniform width, nearly straight in basal half, moderately arcuate in apical half; base faintly punctulate; mandibles small. Antennae inserted about one-fourth from base; scape about as long as first three funicular joints, first nearly as long as second and third together, second little longer than third. Prothorax little wider than long. Elytra one-fourth wider than prothorax, strongly convex, humeri prominent, rounded, striae somewhat deeply impressed. Anterior legs much longer than posterior, the latter not extending beyond the apex of the elytra; femora somewhat feebly clavate; teeth large, of anterior pair strongly developed, much longer than posterior, extending anteriorly and downward in a prominent acute point; teeth of middle femora short with apices scarcely produced; of posterior pair much shorter than anterior, but much longer than middle pair and with apices strongly acutely produced. Fifth ventral segment ♀ concave.

Rostrum ♂ four-sevenths as long as body, proceeding abruptly from head, more slender than in ♀, strongly arcuate, very slightly enlarged at base from which point it very gradually lessens in diameter beyond the middle; apical half a little more slender, apex distinctly enlarged. Antennae inserted directly behind middle. Fifth ventral segment nearly flat with tufts of pale yellow hairs at sides.

Length ♀ 5.0–6.5 mm.; width 2.5–3.5 mm.; length of rostrum ♀ 4.5–6.0 mm. Length ♂ 5.3–6.5 mm.; width 2.8–3.2 mm.; length of rostrum ♂ 3.5–4.0 mm.

Cumberland, Md. (F. E. Brooks—type and allotype); Birmingham, Ala. (J. E. Graf); Raymond, Miss.; Pine Apple, Oakchie, Eakley, Okla., September 29 (R. V. Montague); Raleigh, August 31, 1916 (R. W. Leiby); Grotto, Aceme, Mangum, N. C.; Georgetown, S. C. (W. A. Thomas); Framingham, Mass. (C. A. Frost); Lowell, Mass. (Blanchard); Buffalo, N. Y.; Bedford, Pa.; Odenton, Md., Aug. 8, 1921 (W. H. White); Gainesville, Fla.; DeKalb, Tex.

Reared from *Quercus rubra*, *falcata*, *laurifolia*, *phellos* and *alba*.
Beaten from *Q. marilandica* by Mr. White.

Type, ♀, Cat. No. 28,995, U. S. National Museum.

This species is isolated but exhibits some relationship to the larger *macrodon*. The femora are less strongly clavate; the teeth of the anterior pair more strongly and acutely produced, of the middle pair much shorter, posterior pair distinctly shorter. The vestiture is much finer, especially on the elytra. The anterior femoral tooth is sometimes less prominent than in typical individuals. The rostrum of the female varies in degree of arcuation to about the same extent as in *rectus*, exceptional individuals having the rostrum nearly as straight as in *orthorhynchus*.

8. *Curculio ruficristatus* n. sp.

Elongate ovate, much less than twice as wide as long, general color dark brown. Vestiture golden brown, banded with red, squamules shorter, pale brown on ventral surface. Prothorax short, distinctly transverse, strongly tubular at apex, sides strongly arcuate on apical half, nearly parallel in basal half. Elytra moderately convex, much wider than thorax at base, basal angles subacute, strongly narrowed to apex, apices divergent, striae rather wide but very irregular in width, with long, irregular tufts of coarse red hair. Legs long; femora strongly toothed, middle pair with shorter denticle than the anterior, posterior pair apparently as long as anterior but with shorter denticle.

Rostrum ♂ slightly more than half as long as the body, proceeding abruptly from the head, slightly wider at base and at apex, otherwise nearly of same diameter, moderately arcuate; mandibles large. Antennae inserted slightly behind the middle. First abdominal segment strongly and widely concave, fifth segment subdivided toward apex, the latter composed of a wide tuft of long yellow hairs.

Length ♂ 6.7 mm., width 2.9 mm.; length of ♂ rostrum 4.8 mm.

Chisos Mts., Tex., July 16 (H. A. Wenzel).

Type, ♂, 29,010, U. S. National Museum. A single specimen.

Different from the preceding or following species by the characters furnished in the table, also by others which may be summarized: Vestiture banded with red, irregular on elytra. Pronotum short and transverse, tubular at apex. First ventral concave, last with strong red tube-like tuft.

9. *Curculio orthorhynchus* Chttm. (Fig. 13)

Balaninus orthorhynchus Chittenden, Proc. Ent. Soc. Wash., v. X, p. 26, 1908.

Slender, elliptical ovate, rufo-piceous; antennae and base of rostrum distinctly rufous. Vestiture dense, composed of pale yellowish squamules, finer on dorsal, much shorter and wider on lower surface. Elytra wide at base, strongly acuminate to apex; striae of moderate width, with few scales; vestiture variable, nearly uniformly yellow or with pale brown spots of variable size.

Rostrum ♀ of about the same length as the body, very slender, uniform in diameter, nearly straight, arcuate at extreme apex (six-sevenths from base). Antennae ♀ inserted at about basal fifth, scape about same length as the first two funicular joints, first funicular fully one-fourth longer than second, second a fourth longer than third. Fifth ventral segment subtriangular, strongly concave in medial third, slightly tufted at extreme apex. Legs very long and slender. Femora feebly and suddenly clavate toward apex, posterior teeth small, acutely produced distally into denticles, reentrant angles obtuse, somewhat arcuate.

Rostrum ♂ less than half as long as body; moderately arcuate; antennae inserted near (from slightly before to slightly behind) the middle. Pygidium not tube-like. Fifth ventral segment with a small, partially denuded medial area in apical half.

Length 6.2–7.5 mm.; width 2.8–3.2 mm.; rostrum ♀ 6.5–7.0 mm., rostrum ♂ 3.0 mm.

Types described from French Creek, W. Va. Observed in Pennsylvania (Ziegler and Melsheimer) and Ohio (M. C. Z.); Cumberland, Md. (F. E. Brooks); Birmingham (J. E. Graf), Auburn, Thomasville, Ala.; Redmonds, Highlands, N. C.; Pine Brook, N. J.; Delavan, Wis. (S. B. Fracker); St. Louis, Mo. (T. L. Casey); Dallas, Tex. (Boll).

Breeds in acorns of *Quercus rubra*, *coccinea*, *ilicifolia* (*nana*) and *phellos*.

The rostrum of the female is more nearly straight than in any other long-beaked species of the genus, which character alone will distinguish it, the male rostrum is proportionately shorter and the antennae are placed much nearer the middle. It has somewhat the appearance of a small *rectus*, but is shorter, has distinctly smaller femoral teeth and lacks the open tube-like pygidium in the male.

10. *Curculio longinasus* n. sp. (Fig. 14)

Elongate ovate, a little less than twice as long as wide; strongly convex; dark rufous, rostrum and antennae light yellow-brown. Vestiture dense, dull ochereous, composed of very long squamules, becoming hairy on legs, somewhat faintly mottled with brown on elytra.

Rostrum ♀ nine-tenths as long as body, proceeding abruptly from head, moderately slender, nearly straight in basal half, strongly and uniformly arcuate in apical half, slightly enlarged at extreme base, very slightly at apex. Antennae inserted in front of basal fourth, scape as long as first three funicular joints, first funicular one-third longer than 2; 2 one-third longer than 3. Prothorax slightly transverse, sides parallel beyond middle, rapidly narrowed toward apex. Elytra strongly convex, humeral angles not prominent, striae shallow, intervals apically prominent; each elytron separately rounded at apex. Legs long, femora extending beyond elytra, feebly clavate; tooth small, reentrant angles widely obtuse, somewhat rounded, denticles very small, subobsolete. Fifth ventral slightly concave.

Rostrum ♂ about two-thirds as long as body, a little more strongly and more uniformly arcuate than in ♀, distinctly but moderately enlarged at either extremity, mandibles rather large. Antennae inserted distinctly behind middle; pygidium with a somewhat tube-like tuft of long golden yellow hairs.

Length ♀ 6.2 mm.; width 2.8 mm.; length of rostrum 5.8 mm. Length ♂ 7.0 mm.; width 3.2 mm.; length of rostrum 4.0 mm.

Paradise, Ariz., 1920 (H. H. Kimball).

Type, ♀, Cat. No. 28,996, U. S. National Museum.

A moderately distinctive species, not closely related to either those which precede or which follow it in the table.

10a. *Curculio longinasus mandibularis* n. var. (Fig. 15)

Of similar appearance to typical *longinasus*, differing in the following characters: Vestiture composed mainly of rather short, fine squamules. Rostrum ♂ only slightly more than half as long as the body, somewhat robust, moderately arcuate, strongly enlarged at base and apex; mandibles large. Antennae attached just behind middle; scape as long as first four funicular joints together, first joint more than one-third longer than 2; 2 scarcely longer than 3. Elytra conjointly acuminate at apex.

Length ♂ 6.8 mm.; width 3.1 mm.; length of rostrum ♂ 3.7 mm.

Paradise, Ariz., July 24, 1919 (H. H. Kimball).

Type, ♂, Cat. No. 28,997, U. S. National Museum. Unique.

This variant is quite unusual in having the male rostrum so much shorter than and otherwise different from that in the typical form. It recalls the longer female rostrum of some *uniformis* from Oregon compared with typical *uniformis*.

11. *Curculio multifasciatus* n. sp. (Fig. 16)

Slender, more than twice as long as wide; dark rufous, rostrum, antennae and legs bright rufous. Vestiture dense, yellow ocherous, squamules small, closely set, except on prothorax and legs; elytra ornamented with five narrow deep brown fasciae, which with the paler squamules form a nearly bilaterally symmetrical pattern of nine fasciae; apex also deep brown.

Rostrum ♂ a little less than three-fifths as long as body, moderately slender, proceeding abruptly from the head, strongly nearly uniformly arcuate; feebly enlarged at base, little more strongly at apex; mandibles small. Antennae inserted distinctly behind the middle; scape about as long as first 4 funicular joints, first funicular one-fourth longer than 2; 2 one-fourth longer than 3. Prothorax narrow, slightly transverse, widest at base, at sides somewhat sinuate basally, gradually narrowing apically, squarely truncate at the base. Elytra about one-third wider than prothorax, one-third longer than wide, strongly convex; striae narrow; intervals wide, nearly flat. Femora somewhat weakly clavate; teeth moderately large, reentrant angles slightly obtuse, outer edges nearly straight, denticles very minute, subobsolete. First and second ventral segments depressed, fifth feebly depressed with minute apical subglabrous area; pygidial tuft of hairs long, reddish yellow.

Length ♂ 6.2 mm.; width 2.8 mm.; length of rostrum 3.8 mm.

Wingra Lake, near Madison, Wis., September 14, 1913 (A. C. Burrill).

Type, ♂, Cat. No. 28,998, U. S. National Museum. Unique.

Since the female is unknown, it is difficult to correlate this species with exactness. The distinctive characters of the male consist of the feebly developed femoral club and denticles, and the peculiar

pattern of the elytral vestiture, a form of coloration as striking as it is unusual in the genus.

12. *Curculio pardus* n. sp. (Fig. 17)

Ovate, about four-ninths as wide as long, piceous, rostrum and antennae yellow-brown. Vestiture dense, composed of long, coarse, dull yellow squamules on prothorax, shorter on elytra, strongly interspersed with conspicuous deep brown spots, more or less contiguous or forming somewhat regularly tessellate fasciae; sides, legs and ventral surface pale yellowish gray.

Rostrum ♀ five-sixths as long as body, proceeding abruptly from head, very slender, of uniform width throughout, moderately arcuate, more strongly in apical fourth. Mandibles very small. Antennae inserted at basal five-eighths; scape longer than first two funicular joints, first fully one-fourth longer than second, second one-fourth longer than third. Prothorax transverse, squarely truncate at base. Elytra one-fourth wider at base than prothorax, humeri prominent; striae rather wide, ornamented with yellow scales somewhat distantly placed in a single row; sutural intervals scarcely elevated. Scutellum elongate, convex, acuminate at apex. Legs long, slender; femora strongly clavate, posterior extending well beyond apex of elytra, all pairs with strong teeth, produced into prominent denticles, directed distally with reentrant angles feebly arcuate, strongly obtuse. Fifth ventral feebly narrowly concave at middle.

Rostrum ♂ four-sevenths as long as body, moderately uniformly arcuate, scarcely enlarged at extremities. Mandibles large. Antennae inserted far behind middle. Last ventral feebly compressed at middle.

Length ♀ 5.4 mm.; width 2.5 mm.; length of rostrum ♀ 4.6 mm. Length ♂ 4.7 mm.; width 2.4 mm.; length of rostrum ♂ 2.7 mm.

Alhambra, Riverside, Cal. (R. E. Campbell).

Type, ♂, Cat. No. 28,999, U. S. National Museum. Type and allotype.

Reared from acorns of *Quercus agrifolia* two years after collection.

This species is quite distinct from others in our fauna, being noticeable in this group because of its short, robust body, especially wide across the elytral humeri, in contrast to its long and slender rostrum in the female. The tessellate elytral fasciae with the rows of yellow scales in the striae impart an unusually attractive appear-

ance to the species. In the male specimen the dark spots form three less regular bands.

13. *Curculio gracilis* n. sp.

Elongate ovate, a little more than twice as long as wide, moderately convex, dark rufous; rostrum, antennae and legs bright rufous. Vestiture dense on dorsum, sparse on lower surface, nearly uniform dull brownish gray, composed chiefly of moderately fine, short squamules on dorsum, slender and hair-like on legs, elytra densely dotted with fine pale brown spots; ventral surface and sides slightly paler than dorsum.

Rostrum ♀ fully five-sixths as long as body, moderately slender, nearly uniformly rather feebly arcuate, scarcely enlarged at base and not at all at apex, punctate at base. Mandibles small. Antennae inserted at a point a little less than one-third from the base; scape about as long as first three funicular joints together, 1 nearly one-third longer than 2; 2 nearly one-third longer than 3. Prothorax slightly transverse. Elytra about one-fifth wider than prothorax and three-fourths as wide as long, acuminate to apex; striae fine, moderately deep and wide; intervals flat. Legs quite long and slender. Femora feebly clavate and dentate; reentrant angles of teeth rounded, distal edge strongly obtuse; denticles acute, somewhat strongly produced. Tibiae scarcely sinuate. Fifth ventral segment wide, broadly, moderately deeply concave at middle.

Rostrum ♂ four-eighths to five-eighths as long as body, stouter, curvature a little stronger but similar to ♀, slightly enlarged basally and apically. Antennae inserted just behind middle. First ventral broadly distinctly concave.

Length ♀ 6.0 mm.; width 2.9 mm.; length of rostrum ♀ 5.0 mm. Length of ♂ 5.8 mm.; width 2.7 mm.; length of rostrum ♂ 3.6 mm.

Yavapai Co., Ariz. (O. Buchholz); Globe, Ariz. (D. K. Duncan); Silver City, N. Mex. (J. B. Wallis).

Type, ♀, Cat. No. 29,000, U. S. National Museum. Types, allotypes and paratypes.

Quite distinct from any species previously considered and not closely affiliated to the two species which follow.

14. *Curculio wenzeli* n. sp. (Fig. 18)

Somewhat robust oval, subdepressed, about twice as long as wide; dark piceous, prothorax opaque black, rostrum and

antennae deep rufous. Vestiture somewhat sparse, nearly uniform dark gray, more dense and faintly variegated with pale brownish spots on elytra; scales minute and short, longer and hair-like on legs. Eyes large, narrowly separated; space between about one-third the width of one eye. Elytra narrow, acuminate at apex; striae moderately wide; intervals rather strongly convex.

Rostrum ♀ a little less than five-sixths as long as body, moderately slender, rather feebly, nearly uniformly arcuate, punctulate near base, scarcely enlarged either at base or apex. Antennae inserted in front of basal fourth; scape not as long as first three funicular joints, 1 nearly as long as 2 and 3 together, 2 and 3 subequal. Prothorax slightly transverse. Fifth ventral segment very slightly concave at extreme apex. Legs long, slender, femora feebly clavate, teeth very small, reentrant angle curved, distal edge strongly obtuse, denticles minute, acute but not strongly produced.

Rostrum ♂ half as long as body, curvature similar to ♀, feebly enlarged at base, but distinctly at apex. Antennae inserted at the middle. First and second abdominal segments broadly and feebly concave at middle.

Length ♀ 6.3 mm.; width 2.8 mm.; length of rostrum ♀ 4.8 mm. Length ♂ 6.6 mm.; length of rostrum ♂ 3.3 mm.

Chisos Mts., Tex., July 16-26 (H. A. Wenzel).

Type, ♂, Cat. No. 29,001, U. S. National Museum. Type and allotype.

Differs from *gracilis* especially by the smaller size, the more robust depressed form of the body, the sparse dark gray vestiture and the convex elytral intervals. The male antennae are inserted at the middle, instead of behind the middle, as in the latter. Dedicated to the late H. A. Wenzel.

15. *Curculio pardalis* Chittn. (Fig. 5)

Balaninus pardalis Chittenden, Proc. Ent. Soc. Wash., v. X, pp. 24, 25, 1908.

Balaninus virginicus Cas., Can. Ent., 1910, p. 123 (in part).

♂ *Balaninus appalachius* Cas., l. c., p. 125.

Robust elliptical, piceous or subrufous; antennae, rostrum, and legs rufo-testaceous. Vestiture very dense, composed of long, bright ochraceous or yellow brown squamules on dorsum and legs, and of shorter scales on ventral surface; elytra strongly mottled with small darker brown spots.

Rostrum ♀ three-fourths to four-fifths as long as body, stout, moderately arcuate, more strongly in apical half, distinctly enlarged at base and at apex; a faint carina and punctation barely indicated at extreme base; mandibles large and conspicuous. Antennae inserted in basal third, scape as long as next three joints; funicular joint 1 fully one-third as long as 2, 2 scarcely longer than 3. Prothorax one-fourth wider than long, strongly arcuate near middle, rapidly narrowing toward apex. Elytra three-fourths as wide as long, comparatively wide toward apex, striae very fine. Femora not extending beyond elytra, strongly clavate, teeth moderately large and prominent, reentrant angle nearly right, proximal edge gently sinuous, denticles moderately large, acute. Fifth ventral segment moderately concave in median third.

Rostrum ♂ less than two-thirds as long as body, extending abruptly from the head, a little more strongly arcuate than in ♀, enlarged at each extremity; mandibles very large; antennae inserted well behind the middle. Fifth ventral segment flat at middle, strongly bilobed at apex; pygidium produced into a closed somewhat tube-like brush of long hairs.

Length ♀ 6.0–7.5 mm.; width 2.8–4.0 mm.; length of rostrum ♀ 4.0–5.0 mm.; rostrum ♂ 3.5–4.0 mm.

The known distribution extends from Rhode Island southward to Florida and Alabama and westward to Iowa, Arkansas, Kansas and Texas. The species is abundant in the Atlantic region and evidently rare west of the Mississippi River. The type locality is Washington, D. C.

It breeds in the acorns of *Quercus bicolor*, *velutina*, *pedunculata*, *alba* and *prinus*.

This species is subject to considerable variation as regards color and proportions. Some specimens, including, *e.g.*, marked female collected by F. E. Brooks, at French Creek, W. Va., have the rostrum insensibly enlarged, as remarked by Casey of *virginicus*, and there is a series, obviously depauperated, smaller and paler than the average, in which the female rostra are from five-sixths to ten-elevenths as long as the body, and the legs are very slender.

16. *Curculio victoriensis* Chtttn. (Fig. 20)

Balaninus victoriensis Chittenden, Bul. 44, Div. Ent., U. S. Dept. Agric., p. 31, 1904; Proc. Ent. Soc. Wash., v. X, pp. 23, 24, 1908.

Form elliptical, about twice as long as wide; black, rostrum black, or partly piceous, antennae rufous. Vestiture dense, composed of gray or pale ochereous squamules, fine and short, shorter on lower surface. Elytra lightly spotted with slightly elevated, pale brown, pubescent squamules.

Rostrum ♀ four-fifths as long as body, moderately, nearly uniformly arcuate, very slightly enlarged at extreme base and at apex, basal fourth somewhat strongly punctate. Antennae inserted in basal fourth; scape as long as next $2\frac{1}{2}$ joints, first funicular joint nearly one-third longer than 2, 2 scarcely longer than 3. Prothorax about as wide, or slightly wider than long. Femora strongly clavate, teeth very large, denticles large and prominent; reentrant angles nearly right, a little obtuse. Fifth ventral segment moderately concave in median third.

Rostrum ♂ not exceeding one-half the length of the body, slightly more arcuate, scarcely enlarged at either extremity. Antennae inserted at or slightly behind middle. First and second ventral segments feebly concave, fifth strongly narrowed; a median concave area in apical half with long hairs at sides, denuded and feebly recurved to transverse line at apex; pygidial tuft short.

Length ♀ 5.0–7.0 mm.; width 2.4–3.6 mm.; length of rostrum ♀ 3.8–5.5 mm.; rostrum ♂ 2.8–3.5 mm.

Victoria (type locality) and elsewhere, Texas; Wellington, Kans. (C. L. Scott); Baton Rouge, La., September 27, 1916 (T. H. Jones); Evangeline, La. (E. S. Tucker); Stonewall, Okla.

This species is so closely related to *pardalis* that the ochereous forms are difficult to separate, but the point of insertion of the male antennae, at or slightly behind the middle, is a ready means of recognition. In *pardalis* they are distinctly behind the middle; the rostrum is stouter and more enlarged at base and apex, and the color is usually brighter. In *victoriensis* the femora and the denticles, especially the anterior pair, are more prominent.

Breeds in *Quercus alba*, *virens*, *velutina*, *stellata*, *virginiana*, *marilandica*, *breviloba* and *macrocarpa*. Reared from acorns the year following their collection, also in September and October from material collected two years previously, showing that the species also winters over a second year as a larva. According to observations by J. D. Mitchell, in Texas, adults issue from April 2 to July 1 and again in September and December, which would tend to show that the beetles are more or less active in that state, except in the months of January to March.

16a. *Curculio victoriensis fulvus* n. var.

Of the same form and general appearance as typical *victoriensis*, a little larger and with vestiture nearly uniformly pale yellow-brown or drab; elytra very lightly, scarcely apparently dotted with darker squamules. Rostrum ♀ five-sixths as long as body. Fifth ventral segment strongly concave at median third; of male nearly flat with fine denuded transverse line at apex.

Length ♀ 7.0 mm.; width 3.5 mm.; length of rostrum 6.0 mm. Length ♂ 5.7–7.0 mm.; width 2.8–3.5 mm.; length of rostrum 3.2–3.6 mm.

Type, ♀, Cat. No. 29,003, U. S. National Museum.

Georgetown, S. C. (W. A. Thomas); Mobile, Ala. (H. P. Löding).

Reared from acorns of *Quercus virginiana*, September 19, 1922.

Aberration *b*.—Robust, four-sevenths as wide as long; dark brown, rostrum and antennae lighter brown. Vestiture yellow brown, elytra with few dark spots. Rostrum ♂ four-sevenths as long as body. Prothorax feebly tubulate at apex, widest at middle. Elytra two-thirds as long as the body. Femoral teeth with reentrant angles forming nearly right angles.

Boerne, Tex. Reared from *Quercus velutina*, September 10, 1906.

Undoubtedly an aberration, in the writer's opinion, although a perfect specimen. At first sight it appears to be a short individual of *baculi curtus* but is easily distinguished by the rostral and femoral characters. The head is slightly retracted into the pronotum. The general appearance is that of an entirely distinct species. The length of the elytra of normal *victoriensis* is five-eighths as long as the body.

17. *Curculio emarginatus* n. sp.

Slender subovate, about two and one-half times as long as wide; fuscous, rostrum rufous, black at base and at apex; vestiture dense, composed of nearly uniform pale gray squamules, mostly fine and short, longer on the prothorax; elytra with numerous small, pale brown or fuscous spots.

Rostrum ♀ about three-fourths as long as the body, slender, nearly uniformly moderately arcuate, scarcely en-

larged at base, slightly so at extreme apex; base feebly punctulate. Antennae inserted behind basal third; scape about as long as first three funicular joints, 1 less than one-fourth longer than 2, 2 one-fourth longer than 3. Prothorax feebly transverse, sides subparallel in basal half. Elytra about one-third wider than the prothorax; humeri rounded; striae fine, somewhat shallow; intervals wide and feebly convex. Femora somewhat strongly clavate and dentate; reentrant angles of teeth feebly obtuse, denticles strongly produced. Fifth ventral segment somewhat strongly roundly concave in median third.

Rostrum ♂ half as long as the body, proceeding abruptly from the head. Antennae inserted just in front of the middle of the rostrum. First and second ventral segments nearly flat; fifth not narrowed, uniformly convex, widely and feebly emarginate at apex.

Length ♀ 6.0–6.5 mm.; width 2.5 mm.; length of rostrum ♀ 4.5 mm. Length ♂ 6.0 mm.; width 2.7 mm.; length of rostrum ♂ 3.0 mm.

Las Vegas, N. Mex., August 10–15 (Barber & Schwarz).
On oak.

Type, ♀, Cat. No. 29,004, U. S. National Museum.

Closely resembles *victoriensis*, differing especially by its smaller size, more slender form, shorter rostrum, and by the more feebly clavate and dentate femora. In some females the rostrum is more strongly arcuate, the length of that organ, measuring by the chord of the arc, being not more than two-thirds as long as the body.

18. *Curculio strictus* Cas. (Fig. 21)

♀ *Balaninus strictus* Casey, Col. Not., vii, 1897, pp. 660, 661.

♀ *Balaninus longipes* Casey, l. c., p. 661.

Balaninus virginicus Casey, Can. Ent., 1910, p. 123 (includes *pardalis* in text and specimens).

♂ *Balaninus ordinatus* Casey, l. c., pp. 124, 125.

♂ *Balaninus utensis* Casey, l. c., p. 126.

♀ *Balaninus tubulatus* Casey, l. c., pp. 126, 127.

Ovate, about twice as long as wide, rufo-piceous; rostrum, antennae and legs usually lighter. Vestiture very dense throughout, composed of short, fine squamules, of variable color, pale ochereous, yellowish, reddish, or exceptionally golden yellow, with many feebly to strongly defined irregular

fasciae and spots on the elytra, usually paler on lower surface.

Rostrum ♀ about three-fourths as long as body, moderately slender, nearly uniformly strongly arcuate, not enlarged at either extremity, punctate at base. Antennae inserted at or behind basal third; scape shorter than first three funicular joints, 1 nearly one-third longer than 2; 2 nearly one-third longer than 3. Mandibles small. Prothorax narrow, as wide as, or a little wider than, long; strongly arcuate at sides. Elytra short with prominent humeral angles, feebly acuminate to apex. Legs somewhat shorter, otherwise much as in *nasicus*. Fifth ventral segment moderately concave at middle.

Rostrum ♂ a little more than half as long as the body, subparallel with frons, scarcely enlarged at apex, otherwise nearly as in *nasicus*; antennae inserted about, at or sometimes slightly in front of or even behind the middle. Fifth ventral segment concave at middle. Pygidium with short tuft of yellow hairs.

Length ♀ 5.2–8.0 mm.; width 2.3–4.0 mm.; length of rostrum ♀ 4.5–7.0 mm. Length ♂ 5.4–6.5 mm.; width 2.5–3.3 mm.; length of rostrum ♂ 3.0–3.6 mm.

New Jersey (allotype); Colmanville, Jeanette, Pa.; French Creek, Aurora, Morgantown, W. Va.; Arlington, Afton, Va.; North Carolina; Tennessee; Illinois; Putnam Co., Ind.; Iowa City, Ia.; Kenosha, Nebr.; Topeka, Kans.; Colorado Springs, Manitou, Ouray, Col.; Millcreek, American Fork, Provo, Stockton, Utah; Las Vegas, N. Mex. (type ♀); Williams, Ariz.; Perkins, Okla.; Rosser, Tex.

This species closely resembles *nasicus* with which it agrees in many particulars. It may be distinguished by the more arcuate elytra, the usual absence of the two regularly defined pale, transverse elytral fasciae present in the latter, its uniformly shorter, slightly more robust rostrum in the female, by the male antennae being attached nearer the middle of the rostrum, and by the shorter scape. The degree of arcuation in the rostrum of the female is variable, causing, when measured by the chord of the arc, corresponding variability in the length as compared with that of the body. There is less inconstancy in the shorter male rostrum. The colors of the vestiture vary greatly, from gray to ocher yellow, brown and exceptionally red. The elytra are normally mottled with dark or red brown, either finely or coarsely spotted, in subtesellate form, and not infrequently with little evidence of macula-

tion. The abdominal surface is paler in dark specimens. Careful examination of large series from the Atlantic States and from New Mexico, and of some from Utah, fails to reveal any constant structural character separating the eastern from the western forms. The western examples, however, usually have brighter colored rostra and that of the female is very feebly carinate, except at the extreme base. In the specimens from the Atlantic region this carina is a little more pronounced and the punctuation of the basal portion of the rostrum is also a little stronger.

In most collections examined this species has been placed generally with *nasicus*, and in some cases with *confusor*.

Reared from acorns of *Quercus prinus*, *pedunculata* and *alba*.

Owing to the somewhat unusual variability of this species as regards color and proportions, as evidenced by the list of synonyms, some remarks may be of interest. *Balaninus longipes*, described from Manitou, Colo., differs from the type of *strictus* only in color and size. The type is a large robust female of an exceptionally bright golden yellow color. The male is not in the Casey collection but one from Colorado Springs, Colo., in the National Collection is nearly as bright yellow. *B. virginicus* is normal. To the writer's surprise, *pardalis* was also included in this series which very naturally accounts for Casey's surmise that the writer might possibly have included this form with *pardalis*. *B. ordinatus*, founded on a male from Tennessee, is a robust specimen. *B. utensis* does not differ from other *strictus* in any discernible manner. *B. tubulatus* is founded on a badly mounted, somewhat distorted female from Stockton, Utah. The specimen is flattened and unduly extended.

19. *Curculio q.-griseae* Chhtn. (Fig. 19)

Balaninus q.-griseae Chittenden, Proc. Ent. Soc. Wash., v, X, 1908, pp. 22, 23.

Balaninus proprius Casey, Can. Ent., 1910, p. 121.

Moderately robust ovate, piceous; rostrum, antennae, and legs rufous. Vestiture composed of hair-like squamules, yellowish brown on dorsum, silvery gray on ventral surface; elytra with large, variable subtransverse pale fasciae. Head with a distinct interocular line with prominent tufts of squamules each side.

Rostrum ♀ three-fifths as long as body, slender, of uniform width, arcuate, rather more so toward apex. Antennae inserted behind basal fourth, scape short, about as long as first two funicular joints, first funicular long, second and

third subequal. Elytra moderately narrowed toward apex; striae deep and wide; intervals somewhat strongly convex. Femora strongly clavate, of posterior legs not extending to elytra, teeth large with long conspicuous denticles, especially on anterior pair. Fifth ventral strongly impressed at middle third.

Rostrum ♂ slightly less than half as long as body, curvature somewhat stronger than in ♀; stout, much enlarged at base but proceeding abruptly from head, squamules covering nearly half from base to antennal insertion. Antennae inserted at or just behind middle. Last ventral and pygidium with yellow hairs forming a tuft beyond the elytra.

Length 6-7 mm.; width 2.8-3.2 mm.; length of rostrum ♀ 3.6-4.0 mm.; rostrum ♂ 2.9-3.2 mm.

Inhabits Arizona (type, Ft. Grant). Reared from acorns of *Quercus grisea* and collected on *Q. gambelii*.

A moderately isolated form. The coloration is variable, some individuals being nearly reddish brown with distinctly paler bands, some nearly uniform brown or gray, others gray with yellowish prothorax and a few yellow transverse bands. The silvery gray lower surface by contrast with the darker dorsum is a distinguishing feature. This species does not occur in Indiana as surmised by Casey. His type does not differ from that of the writer.

20. *Curculio confusor* Ham. (Figs. 22, 24)

Balaninus confusor Hamilton, Can. Ent. XXV, 1893, pp. 309, 310.

Elongate suboval, vestiture very dense, ochereous yellow, irregularly spotted and banded on elytra, scarcely lighter on ventral surface; vestiture fine, hair-like, scaly on venter and sides.

Rostrum ♀ three-fifths as long as the body, stout, much enlarged at base, more moderately at apex. Antennae inserted less than one-third from base, scape nearly as long as first 4 funicular joints. Legs short, femora strongly clavate and strongly convex, posterior pair scarcely extending beyond elytra, tooth comparatively short, reentrant angle obtusely rounded, distal edge less than half as wide as femur at that point, anterior femora less strongly toothed. Fifth ventral very deeply and widely concave, concavity circular.

Rostrum ♂ two-fifths as long as body, very stout, parallel with frons and very strongly enlarged at base. Antennae inserted well in front of middle. Abdomen with a double

concavity, first and second segments feebly concave at middle, third, fourth and fifth very deeply and broadly concave.

Length ♀ 6.5–7.0 mm.; width 3.5 mm.; length of rostrum ♀ 4.0 mm. Length ♂ 5.0–6.5 mm.; length of rostrum ♂ 2.5 mm.

The distribution is wide, including New York, New Jersey, Pennsylvania, Maryland, District of Columbia, Virginia, West Virginia, Ohio, Michigan, Wisconsin, Tennessee, Missouri, and South Dakota. Recorded as occurring in Massachusetts, Indiana, Illinois and North Carolina. Type locality probably Allegheny, Pa., but not indicated. Dr. John Hamilton, describer of the species, appears to have taken it in numbers in Pennsylvania, and there is a good series from there in the collection of the Museum of Comparative Zoology collected by Melsheimer & Ziegler, but elsewhere it is somewhat rarely found.

Breeds in acorns of *Quercus nana* and *Q. prinus*.

A distinctly isolated species. The short strongly convex femoral club with the posterior tooth near the apex of the femur, and the deeply concave abdomen of the male distinguish this species from any other described form.

21. *Curculio uniformis* Lec.

Balaninus uniformis Leconte, Pacif. R. R. Rept., 1857, p. 57.

Balaninus occidentis Casey, Ann. N. Y. Ac. Sci., v. IX, 1897, pp. 858, 859.

Balaninus brevirostris Casey, l. c., p. 662.

Balaninus caseyi Chittenden, Proc. Ent. Soc. Wash., 1908, p. 26.

Elongate suboval, less than twice as wide as long, strongly convex, vestiture dense, ochereous yellow, variegated with irregular yellow-brown spots, forming irregular fasciae on the elytra, considerably paler on ventral surface.

Rostrum ♀ five-eighths to six-eighths as long as body, slender, moderately arcuate in anterior half. Antennae inserted on rostrum about two-fifths from base to apex; scape as long as first $3\frac{1}{2}$ funicular joints. Mandibles small. Legs long; anterior femora much shorter than rostrum, posterior pair extending well beyond apex of elytra, somewhat clavate, especially anterior pair, and correspondingly small teeth, with obtuse reentrant angles and prominent denticles. Fifth ventral segment deeply concave in middle third.

Rostrum ♂ a little less than half as long as body, considerably enlarged at base, inclined to become parallel with the frons; point of antennal insertion fully three-fifths from base to apex. First abdominal segment feebly broadly concave at middle, fourth and fifth a little less concave, fifth sparsely squamulose. Pygidium with dense mass of red hairs.

Length ♀ 4.8–6.4 mm.; width 2.2–3.2 mm.; length of rostrum ♀ 2.8–4.8 mm. Length of rostrum ♂ 2.6–3.1 mm.

Inhabits California (type), Utah (Am. Fork Canyon), and Oregon.

A very distinct species. Specimens collected on canyon live oak (*Quercus chrysolepis* and *californica*) by Albert Koebele. H. C. Fall states that the species affects several species of oak. Some female specimens from Oregon have much longer beaks than California examples.

22. *Curculio parvidens* Chttm. (Fig. 25)

Balaninus parvidens Chittenden, Proc. Ent. Soc. Wash., v. X, p. 24, 1908.

Elongate oval, dark piceous, antennae and sometimes rostrum rufous. Vestiture dense, pale yellowish gray, composed of fine squamules, nearly hairy on dorsal surface, much shorter and wider below; elytra variegated with a few small, pale brown spots.

Rostrum ♀ three-fifths as long as body, of moderate diameter, strongly and subequally arcuate, scarcely enlarged at base and faintly at apex. Antennae moderately slender, inserted nearly one-fifth from base; scape shorter than first two funicular joints. Fifth ventral segment subtriangular, moderately tufted at extreme apex. Elytral humeri prominent, striae narrow, with few scales. Femora somewhat strongly clavate, with posterior teeth very small and reentrant angles obtuse and feebly rounded.

Rostrum ♂ half as long as body, stouter and slightly more arcuate than in ♀, more distinctly enlarged at apex. Antennae inserted well behind middle. Fifth ventral segment with feebly concave, sometimes nearly bare, median area with small tuft of long yellow hairs each side and a longer pygidial tuft.

Length ♀ 6.0–7.0 mm.; width 2.8–3.2 mm.; length of rostrum ♀ 3.3 mm. Length ♂ 5.4–6.0 mm.; width 2.4–3.1 mm.; length of rostrum ♂ 2.6–3.0 mm.

Recorded from Texas (Victoria, Tex., type), Mississippi and Alabama. Seen from Rock Point, Smithfield, Jonesboro, N. C.

Reared from the acorns of *Quercus nigra*, *stellata* (*minor*) and *virginiana*.

Very distinct in this group of small species by the point of insertion of the female antennae which is about two-ninths from the base to the apex, nearer the base than in any other species.

23. *Curculio baculi* Chtttn. (Fig. 23)

Balaninus baculi Chittenden, Proc. Ent. Soc. Wash., vol. X, pp. 20, 21, 1908.

Moderately elongate-ovate; vestiture scant; of lower surface and legs, composed of short pale gray scales; of elytra, similar, with many small, moderately dull brown, inconspicuous scaly areas.

Rostrum ♀ a little less than three-fifths as long as the body, slender, of nearly uniform width, slightly widened at extreme base and apex, impunctate, nearly straight to anterior fourth or third, where it is more or less abruptly recurved. Antennae inserted just behind proximal third. Scape scarcely longer than first two funicular joints, 1 a little shorter than 2 and 3 together, one-fourth to one-third longer than 2; 3 scarcely shorter than 2. Fifth ventral segment deeply and widely concave at middle, with sides more than usually arcuate and rounded. Femora comparatively slender, teeth small, acute, with reentrant angle weak and rounded.

Rostrum ♂ a little shorter than in ♀, distinctly more than one-half as long as body, moderately and nearly uniformly arcuate, more thickened at extreme base and distinctly punctate. Fifth ventral segment with a very small apical bare area, showing margin, with tuft of hairs each side. Pygidium with long tuft of yellowish hairs.

Length 5.0–7.5 mm.; width 2.8–3.2 mm.; length of rostrum ♀ 3.5–4.0 mm.; rostrum ♂ 2.8–3.5 mm.

Recorded from New York (Ithaca, type locality), westward to Michigan and southward to Mississippi, Alabama and Oklahoma. More recently the species has been reared from acorns from Wisconsin and Florida and specimens have been seen from Brewster County, Chisos Mountains, and elsewhere in Texas, and from Ottawa, Ont., and Aylmer, Quebec, Canada.

It breeds in *Quercus*, *alba*, *rubra*, *coccinea*, *velutina*, *prinus*, *bicolor*, *ilicifolia* and *phellos*. Specimens reared from the small acorns of willow oak are correspondingly and unusually small, measuring less than 4.0 mm. in length or half the size of the largest

specimens which attain a length of fully 8.0 mm. Specimens were reared in October, 1921, from acorns from Macclenny, Fla., from which larvae had emerged two years previously, the insect having passed two years as larva.

Specimens from other localities than the type exhibit much variation as regards the rostral structure, which is seldom so abruptly recurved at the apex.

The type of this species, described from Ithaca, N. Y., and formerly well known in collections as *uniformis*, possesses quite a distinctive habitus, not at all closely resembling *nanulus*, although structurally these two species are related. The differences may be tabulated as follows:

C. baculi Chttn.

Elongate-ovate, wide at humeri. Scaly covering of body mostly short.

Head wide. Prothorax slightly transverse, feebly tubulate at apex.

Rostrum ♀ nearly three-fifths as long as body, dark brown, arcuate, at least apically.

Antennae ♀ inserted behind basal third, first funicular joint one-fourth to one-third longer than 2.

Rostrum ♂ more than one-half as long as body.

Length 5.0–7.5 mm.

Mass.—Ala.

C. nanulus Cas.

Narrowly elongate-oval. Scaly covering mostly narrow, long and hair-like.

Head narrow. Prothorax about as long as wide, not tubulate at apex.

Rostrum ♀ about one-half as long as body, bright red, nearly straight.

Antennae ♀ inserted at basal third, first funicular joint scarcely one-fourth longer than 2.

Rostrum ♂ less than one-half as long as body.

Length 5.5–6.0 mm.

New Mexico.

23a. *Curculio baculi curtus* Chttn. (Fig. 23c)

Balaninus baculi curtus Chittenden, Proc. Ent. Soc. Wash., v. X, p. 21, 1908.

Differs from typical *baculi* in its smaller size, wider elytra, and paler colored scales. The rostrum is proportionately and very distinctly shorter, more slender and not so abruptly recurved at the apex, frequently being nearly straight.

The typical form has been observed only from Texas (Boerne, type locality) and Florida, where it replaces typical *baculi*. Study of a much larger series than was available at the time that the

original description was made hardly shows *curtus* to be a geographical race, but a variant, since specimens with straight beaks sometimes occur in most intermediate localities from Texas northward to Massachusetts.

Reared chiefly from acorns of *Quercus velutina* and *rubra*.

24. *Curculio cervulinus* n. sp. (Fig. 26)

Slender oval, more than twice as long as wide, red brown; rostrum, antennae and legs rufous. Vestiture dense gray brown, composed mostly of small slender squamules on dorsal surface, mixed with very fine squamules densely covering the prothorax and elytra, the latter sparsely spotted with brown; lower surface and sides densely, uniformly coated with short, fine, silver gray scales.

Rostrum ♀ two-thirds as long as body, as long as elytra, of moderate width, moderately and nearly uniformly arcuate, scarcely enlarged at base, distinctly at apex. Mandibles large. Antennae inserted a little farther than one-fourth the distance to apex; scape as long as $2\frac{1}{2}$ funicular joints, first about one-fourth longer than 2; 2 less than one-fourth longer than 3. Prothorax about as wide as long. Elytra three-fourths as wide as long; striae fine, shallow; intervals flat. Legs moderately long, slender; femora feebly enlarged, teeth moderately small, reentrant angles rounded, distal edge moderately obtuse, denticles acute and produced; teeth of middle pair only slightly smaller. Tibiae strongly sinuate. Fifth ventral segment with a small deep rounded concavity at middle, midway between base and apex.

Rostrum ♂ half as long as body, stouter, enlarged basally, curvature similar to female. Antennae inserted distinctly behind middle.

Length ♀ 6.0 mm.; width 2.8 mm.; length of rostrum ♀ 4.0 mm. Length ♂ 5.8 mm.; width 2.8 mm.; rostrum ♂ 2.6 mm.

Pachico Pass, Santa Clara Co., Calif. (E. A. Goldman). Reared from acorns of *Quercus douglasii*, August 20, 1909.

Type, ♂, Cat. No. 29,006, U. S. National Museum. Type and allotype.

The distinctly attractive fawn-colored vestiture of the dorsum alone readily serves to distinguish this species from others occurring in the same region. Otherwise it resembles the Arizona *gracilis*, differing chiefly by the shorter rostrum in both sexes, the small rounded fifth ventral concavity in the female, and the distinctly sinuate tibiae.

25. *Curculio undulatus* Cas. (Fig. 27)

Balaninus undulatus Casey, Col. Not. VII, pp. 659, 660.

Robust oval, about twice as long as wide, brown. Vestiture bright ochereous, very dense throughout even on legs, composed of very fine, slender, closely placed squamules, much paler on ventral surface, lightly spotted with brown on elytra.

Rostrum ♀ less than two-thirds as long as body, proceeding abruptly from head, moderately slender, very feebly punctulate near base; of nearly uniform diameter, moderately subuniformly arcuate. Antennae inserted in front of basal third; scape as long as first $2\frac{1}{2}$ funicular joints, first funicular about one-fourth longer than second, second very little longer than third. Prothorax transverse, widest at base, which is strongly sinuous. Elytra one-third wider than prothorax, one-fourth longer than wide, strongly convex; striae dotted with one row each of distantly placed squamules. Legs rather short; posterior femora extending slightly beyond elytra, feebly clavate, tooth very small, reentrant angle with distal edge obtuse, denticle prominent; tibiae rather robust, feebly sinuous, densely clothed with very long hairs. Fifth ventral segment somewhat weakly concave at middle with long parallel hairs in concavity.

Rostrum ♂ three-fifths as long as body, somewhat stout, scarcely more arcuate than in ♀, a little enlarged at base and strongly at apex. Antennae inserted just behind middle, mandibles rather large. Fifth ventral impressed at middle, pygidium with usual fringe of golden yellow hairs.

Length ♀ 5.0–6.0 mm.; width 2.6–2.8 mm.; length of rostrum ♀ 3.8–4.0. mm. Length ♂ 5.4 mm., of rostrum 3.3 mm.

“Arizona” (type); Santa Catalina Mts., reared from acorns of *Quercus alba*, October 10, 1916, collected by Mr. Chrisman.

The type is a male and the female has not hitherto been described. As remarked by Casey, this species is quite isolated and is not closely related to any other.

26. *Curculio microdon* n. sp.

Elongate ovate, a little less than half as wide as long; rufo-piceous, rostrum bright rufous, antennae and legs pale rufous. Vestiture moderately dense, uniform pale yellow brown, composed mostly, except on prothorax, of fine squamules, scarcely imbricated.

Rostrum ♂ more than half as long as body, proceeding rather abruptly from the head, slender, of nearly uniform width, moderately nearly uniformly arcuate. Antennae inserted at middle, first funicular joint more than one-third longer than 2; 2 about one-fifth longer than 3. Mandibles moderately small. Prothorax slightly transverse, well narrowed apically, sinuate at base. Elytra more than four-fifths as wide as long, strongly tapering to acuminate apex; striae moderately wide; intervals feebly convex. Femora feebly clavate; anterior without tooth but with distinct denticle; middle and posterior more distinctly but feebly toothed, teeth with reentrant angles strongly obtuse, distinctly denticulate as in anterior pair. Tibiae moderately sinuous. Fifth ventral segment slightly depressed at extreme apex. Pygidium with somewhat tube-like tuft of yellow hairs at apex.

Elongate oval, more than twice as long as wide, rufopiceous, rostrum and antennae yellow brown. Vestiture light brown, composed mostly of short fine squamules; prothorax and elytra partly covered with much longer gray squamules. Ventral surface somewhat densely and uniformly coated with long, fine, gray squamules.

Rostrum ♀ less than two-thirds as long as body, a little longer than elytra, thicker than *microdon*, of nearly uniform width, not enlarged at base or apex, moderately, nearly uniformly arcuate. Antennae inserted about one-third from base; scape distinctly shorter than first three funicular joints together; first one-fourth longer than second, second one-fourth longer than third. Prothorax transverse, nearly uniformly arcuate at the sides. Elytra two-thirds as wide as long, feebly convex. Legs moderately long and slender. Femora feebly enlarged; teeth of anterior and posterior pairs somewhat strong, obtusely angled, extreme apex acute, feebly denticulate; teeth of middle pair much smaller, rounded, tending to become obsolete. Tibiae scarcely sinuous on inner surface. Fifth ventral segment strongly widely concave at middle. Elytra with tuft of hair at apex.

Length ♂ 5.5-6.8 mm.; width 2.3-3.2 mm.; length of rostrum ♂ 3.4-4.0 mm.

Dallas, Tex., reared from acorns of *Quercus rubra* (C. R. Jones); Chiricahua Mts., June 1, 1908 (E. P. Van Dyke); Ft. Wingate, N. Mex. (W. T. Davis).

Type, ♂, Cat. No. 29,013, U. S. National Museum. Type and paratypes.

27. *Curculio obtusus* Blanch. (Fig. 4)

Balaninus obtusus Blanchard, Bul. Bklyn. Ent. Soc., 1884, p. 107.

Short, ovate, scarcely twice as long as wide; rufo-piceous, rostrum, antennae and legs dark rufous. Vestiture dense, squamules very short on prothorax, varying from gray to yellow ochereous and red, uniform or strongly and irregularly banded with deep brown to black on elytra; ventral surface silvery gray, squamules very small and short.

Rostrum ♀ half as long as body, moderately slender, moderately, nearly uniformly arcuate, scarcely enlarged at base, distinct at apex, mandibles rather small. Antennae inserted distinctly behind middle, scape a little longer than first three funicular joints, first and second funicular joints subequal, second about one-fourth longer than third. Prothorax small, very narrow, nearly as long as wide, widest at base. Elytra fully one-third wider and three times as long as prothorax, strongly convex. Legs short, posterior femora not extending to apex of elytra, femora feebly clavate, tooth of anterior pair small, reentrant angle strongly obtuse, denticle prominent; of posterior pair a little larger, distal edge slightly more than half as long as width of femur, somewhat strongly obtuse, terminating in a less prominent denticle. Tibiae moderately thick, slightly sinuous. Fifth ventral slightly depressed.

Rostrum ♂ a little less than half as long as body, slightly more arcuate than in ♀, thicker, somewhat more enlarged both at base and at apex. Mandibles large. Antennae inserted at or slightly in front of middle. First ventral broadly concave, fifth with long tuft of hairs.

Length ♀ 6.0–7.5 mm.; width 3.0–4.0 mm.; length of rostrum ♀ 3.0–3.7 mm. Length ♂ rostrum 2.5–3.0 mm.

Maine, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Illinois, Indiana, Michigan, Wisconsin, Iowa, West Virginia, Maryland, Ontario, Manitoba, Can., "Texas." The distribution extends into Mexico and, according to Champion, to Guatemala. No type locality specified.

Breeds in hazelnut (*Corylus americana*).

An isolated species, as shown both by the structure and food habit. In addition to the characters indicated in the table, the small prothorax, much wider and larger elytra with prominent humeri, and abdomen readily separate this from all related species. The subequal first two funicular joints are also a distinctive character.

28. *Curculio numenius* n. sp. (Fig. 28)

Somewhat slender, distinctly less than twice the width; rufo-piceous; rostrum, antennae and legs bright rufous. Vestiture very dense, composed of very fine, pale ochereous squamules, much longer on prothorax, closely placed on elytra, which is banded with pale brown, scarcely paler on ventral surface, densely covering abdominal segments.

Rostrum ♀ one-half as long as body, comparatively slender, inclined to be subparallel with frons at base, nearly straight in basal half, somewhat strongly arcuate apically, apex scarcely enlarged; mandibles small. Antennae inserted well behind the middle, nearly two-fifths from base to apex; scape longer than first three funicular joints together, first funicular fully one-third longer than second, second about one-fourth longer than third. Prothorax strongly convex, narrow, about as long as wide, sides subparallel in basal half, gradually narrowed to apex. Elytra about one-fourth wider than prothorax, about one-third longer than wide, moderately convex; humeri not prominent, feebly arcuate; striae rather narrow, intervals convex. Legs short, posterior femora extending to apex of elytra; femora somewhat strongly clavate, teeth moderately large, reentrant angles strongly obtuse, of anterior pair with prominent denticles, of middle and posterior pair with denticles feebly developed. Tibiae moderately thick, slightly sinuous. First and second ventral segments nearly flat, fifth deeply ovally depressed at middle.

Rostrum ♂ one-half as long as body, subparallel with frons, much enlarged at base, narrowing gradually to point of insertion of antennae, thence uniformly slender to apex, which is slightly enlarged; nearly straight in proximal two-fifths, moderately subequally arcuate in distal three-fifths; somewhat feebly carinate and coarsely punctate in basal third; mandibles rather large. Antennae inserted well in front (less than three-fifths) of rostrum.

Length ♀, ♂ 6.4–7.2 mm.; width 3.1–3.3 mm.; length of rostrum 3.2–3.4 mm.

Lake Okoboji, Iowa, June 20–July 15, 1917 (L. L. Buchanan, type, allotype and paratype localities); Lake Miller, Ind.; Marquette, Mich. (T. L. Casey); Volga, S. Dak.; Palmer Lake, Colo., June 30, 1905 (C. P. Gillette); eastern Ontario; Wawansea (Mrs. E. Ellis), Aweme, Manitoba, Canada (N. Criddle).

Type, ♀, Cat. No. 29,014, U. S. National Museum. Paratypes also in the Canadian National collection.

The rostral characters closely resemble those of *obtusum* and form a link between that species and *funicularis* and its allies. In the location of the scape the resemblance is more strongly like the latter.

29. *Curculio funicularis* n. sp. (Fig. 29)

Elongate ovate, twice as long as wide, moderately convex dorsally; piceous, rostrum, antennae, elytra and legs dark rufous brown. Vestiture dense, composed of very short pale ocherous squamules, somewhat faintly banded with gray and dotted with pale brown on elytra, scarcely lighter on ventral surface.

Rostrum ♀ about half as long as body, base parallel with the frons, moderately thick, but gradually narrowing to near apex, nearly straight in basal three-fourths, arcuate at apex. Antennae inserted slightly behind middle, scape as long as first four funicular joints; latter very short, first fully one-third longer than second, second about one-fourth longer than third, third short, scarcely longer than fourth. Prothorax nearly as wide as long, of usual form, somewhat feebly lobed at middle. Scutellum whitish, subovate. Elytra one-fourth wider than prothorax, humeral angles strongly rounded, apex comparatively wide. Legs rather short, extending somewhat beyond elytra; femora moderately clavate; teeth rather large, reentrant angle somewhat obtuse, slightly rounded; denticles large, acute on anterior femoral tooth, subacute on middle and posterior pair. Tibiae rather robust, somewhat feebly sinuate. Fifth ventral segment with light median depression, somewhat shallow, nearly covered with hair-like squamules.

Rostrum ♂ nearly as long as in ♀, continuous with frons, a little more arcuate near apex, which is strongly enlarged. Antennae inserted nearly three-fifths from base. Ventral

segments subuniformly flat, with subglabrous depression at apex of fifth. Pygidium with flattened brush of pale hairs.

Length ♀ 6.3–7.0 mm.; width 2.8–3.3 mm.; length of rostrum ♀ 2.8–3.2 mm. Length ♂ 5.8–6.0 mm.; width 2.9–3.1 mm.; length of rostrum ♂ 2.8–3.0 mm.

Las Vegas, New Mex., August 12 (Barber and Schwarz, type and allotype); Toronto, Canada, September 8, 1910 (Evans).

Type, ♂, Cat. No. 29,008, U. S. National Museum. Paratype in the Canadian National collection.

This species may be recognized by the characters tabulated.

30. *Curculio iowensis* Cas. (Figs. 30, 31)

Balaninus iowensis Casey, Can. Ent., 1910, pp. 122, 123.

Oblong oval. Body a little more than twice as long as wide, piceous; rostrum, antennae and legs rufous. Vestiture moderately dense, pale yellow ochereous; elytra with a normally broad medial pale brown fascia and a similar shorter interrupted subapical fascia; ventral surface little paler. Squamules short, somewhat coarse.

Rostrum ♀ about half as long as body, subparallel with frons, thick, nearly uniformly feebly arcuate, much enlarged at base, narrowing to the point of antennal insertion, moderately dilated at apex, surface coarsely punctate and coated with squamules at base; strongly carinate in basal third; mandibles moderately large. Antennae inserted just behind the middle; scape nearly as long as first 4 funicular joints, first funicular fully one-third longer than second, second similarly longer than third, the latter very short. Prothorax as long as wide, widest near middle. Scutellum concolorous with adjacent parts. Elytra two-thirds as wide as long, about one-fifth wider than prothorax, humeri rounded, not prominent; intervals nearly flat. Femora a little shorter than rostrum, stout, somewhat strongly clavate, teeth of moderate size, distal edge less than half as long as width of femur, reentrant angles obtuse rounded; denticles large, acute, very prominent on anterior pair. Fifth ventral segment moderately and narrowly concave at middle.

Rostrum ♂ only two-fifths as long as body, more thickened at base and more arcuate at apex than in ♀, covered with squamules from vertex to point of attachment of antennae. Antennae inserted nearly two-thirds from base to apex. Fifth ventral slightly depressed, not concave, with shortened hairs and minute glabrous area at extreme apex; pygidial hairs yellow, short and flat.

Length ♀ 6.3–7.8 mm.; width 2.8–3.8 mm.; length of rostrum ♀ 2.9–3.2 mm. Length ♂ 6.5–7.3 mm.; width 2.6–3.5 mm.; length of rostrum ♂ 2.5–3.2 mm.

Keokuk, Ia. ♂ (type); Ithaca, N. Y., June 25, New York, N. Y. (Chittenden); Central Park, L. I. (W. T. Davis); Watch Hill, R. I. (W. Robinson); Washington, D. C. (Chittenden); Beltsville, Md. (L. L. Buchanan); Veith, Va. (W. L. McAtee), Richmond, Va. (W. T. Davis); Charter Oak, Pa., June 22, 1920 (J. N. Knull); Harrisburg, Pa., June 15, 1913 (A. B. Champlain); Allegheny, Jeanette, Pa.; Madison, Wis.; Topeka, Kans. (C. H. Popenoe); Morgantown, W. Va. (A. D. Hopkins); French Creek, W. Va. (F. E. Brooks); Linville Falls (4,000 ft.), Henderson, N. C., June, 1907 (F. Sherman).

Collected by the writer on oak, by Mr. Davis on *Quercus minor* and by Mr. Brooks on *Q. alba*.

The first funicular joint is sometimes nearly as long as the second and third together and may be a little less than a third longer than the second, and the second is not more than one-fourth longer than the third. The color of the vestiture is subject to the usual variation from pale ochereous to reddish. It is usually darker than *numenius* and more distinctly fasciate and the beak is shorter and thicker. In many specimens the point of antennal insertion is nearer the base in both sexes.

31. *Curculio ibis* n. sp.

Elongate ovate, twice as long as wide, noticeably narrowed at each end, dark brown; rostrum, antennae and legs bright rufous. Vestiture coarse and dense, pale ochereous yellow, elytra with a rather wide transverse fascia behind the middle. Head small, narrow, eyes noticeably small and somewhat closely placed together.

Rostrum ♀ about one-half as long as the body, subparallel with frons, slightly more slender than *iowensis*. Antennal scape only as long as first three funicular joints, first joint nearly as long as second and third together. Prothorax feebly transverse, sides subparallel in the basal half, anterior half strongly narrowed. Elytra much wider at humeri than the prothorax. Legs short, femora of posterior pair not extending beyond the apex of the elytra.

Rostrum ♂ of about the same length and of similar character to ♀; antennae inserted nearly three-fifths from the base.

Length ♀ 6.2–6.6 mm.; width 3.1–3.4 mm.; rostrum ♀ 2.8–3.1 mm. Length ♂ 5.6–7.0 mm.; width 2.8–3.1 mm.; rostrum ♂ 2.6–3.2 mm.

Williams, Ariz. (Barber and Schwarz), on *Quercus gambelii*.

Type, ♀, Cat. No. 29,016, U. S. National Museum.

The small eyes alone will serve as a ready means of recognition of this species. It is closely related to *iowensis*, from which it is further distinguished by its coarser vestiture, smaller head, wider and different shaped pronotum, shorter scape and shorter legs.

32. *Curculio exilis* n. sp.

Slender, elongate oval, more than twice as long as wide; dark brown, rostrum, antennae and legs deep rufous. Vestiture dense, composed of extremely fine, hair-like squamules, sparse and longer on legs; elytra with pale subapical fasciae. Eyes small and widely separated.

Rostrum ♀ a little more than half as long as the body, comparatively slender, subparallel with frons, feebly enlarged at base, rather strongly at apex, nearly straight in proximal two-thirds, feebly arcuate in the distal third; mandibles small. Antennae inserted far behind the middle (more than two-fifths from base); scape about as long as first 3 funicular joints, 1 about one-fourth longer than 2, 2 one-fourth longer than 3. Prothorax about as wide as long, of normal shape. Scutellum wide, slightly paler than elytra. Elytra one-third wider than prothorax, humeri feebly indicated; striae very fine; intervals flat. Legs short and slender, posterior femora not attaining the end of the elytra; femora somewhat feebly clavate, teeth of moderate size, reentrant angles nearly right-angled, distal edge strongly rounded, denticles large, acute. Tibiae slender, rather strongly sinuous. Fifth ventral segment with moderately deep concave oval area at middle.

Length ♀ 5.0 mm.; width 2.2 mm.; length of rostrum ♀ 2.8 mm.

Ottawa, Ontario, Can., on oak, August 17.

Type, ♀, unique, in Canadian National collection.

Distinct from any species hitherto described. The shape of the body is like those forms with moderately long beaks, e.g., *uniformis*. The male has not been seen.

33. *Curculio monticola* Cas. (Fig. 32)

Balanus monticola Casey, Col. Not. VII, p. 663.

Balaninus timidus Casey, Can. Ent. 1910, pp. 121, 122.

Elongate subovate, twice as long as wide, piceous throughout; prothorax strongly convex, elytra and abdomen comparatively depressed. Vestiture dense, composed of coarse ochraceous squamules, scarcely paler on ventral surface, strongly spotted and somewhat distinctly banded on elytra with pale brown, becoming hairy, almost bristly on legs.

Rostrum ♀ slightly more than one-half as long as body, proceeding abruptly from the head, somewhat feebly, nearly uniformly arcuate, strongly punctate in basal half and carinate in front of the eyes, somewhat strongly enlarged at base and at apex. Mandibles of moderate size. Antennae inserted well behind middle, at which point the rostrum is distinctly expanded at the sides; scape nearly as long as first 4 funicular joints, the latter short and thick, 1 one-fourth longer than 2, 2 fully one-fourth longer than 3. Prothorax nearly as long as wide, sides subparallel in basal two-thirds, feebly tubulate apically; vestiture nearly uniform on disc. Scutellum whitish. Elytra fully one-fourth wider than prothorax; striae rather wide and deep, intervals convex, elevated. Legs short, thick, anterior pair much longer than posterior; femora scarcely extending to apex of elytra, somewhat strongly and abruptly clavate; teeth rather small, reentrant angles widely obtuse, distal edge rounded, with feeble, not prominent denticles; tibiae nearly straight, of moderate size. Fifth ventral segment feebly concave at middle.

Rostrum ♂ slightly less than one-half as long as body, subparallel with frons, moderately and uniformly arcuate, strongly punctate in basal half, much enlarged at base, very strongly at apex. Mandibles rather large. Antennae inserted well in front of middle. First and fifth ventral segments moderately impressed; pygidium with large somewhat tubular brush of long hair.

Length ♀ 4.8–6.4 mm.; width 2.4–3.2 mm.; length of rostrum ♀ 2.6–3.3 mm. Length ♂ 3.1–5.0 mm.; width 2.4–3.2 mm.; length of rostrum ♂ 2.4–3.1 mm.

Colorado Springs, Colo. (type a single female); Las Vegas, N. M., August 3–16 (Barber and Schwarz); Alpine, Tex., Chisos Mts., Tex., July 16, 17 (H. A. Wenzel).

Balaninus timidus is founded on a rather small but not depauperated, male example, from Alpine, Tex., the type of which has been studied.

Quite distinct from other species in our fauna, recognizable by the strongly convex prothorax, with comparatively flat elytra and abdomen, rostrum longer than in other short-beaked species, abruptly clavate femora, and blunt teeth with feebly developed denticles.

In one male the rostrum is a little shorter than normal, the elytra more nearly flat; striae not so wide or deep, surface with darker elevated brown maculae, forming a pale fascia well behind the middle, and the femora with denticles so minute as to appear absent as viewed from the inner surface.

34. *Curculio crassirostris* n. sp.

Moderately robust, ovate; piceous, rostrum, antennae, elytra and legs deep rufous. Vestiture of dorsum somewhat sparse, composed of pale yellow finely hairy squamules; on lower surface of short, slender, gray squamules; elytra with yellow-brown subtransverse fasciae.

Rostrum ♀ about half as long as body, feebly, nearly uniformly arcuate, proceeding somewhat abruptly from head, very thick, of uniform diameter, except slightly thicker at extreme base and at extreme apex. Antennae inserted a little behind middle of rostrum; scape very long, about equal to first 4 funicular joints together, 1 nearly one-third longer than 2, 2 scarcely longer than 3. Prothorax nearly as long as wide. Elytra fully one-fourth wider than prothorax; striae wide and deep; intervals strongly convex. Femora short, posterior not extending to apex of elytra, moderately clavate, teeth with reentrant angles, especially of anterior and middle femora, widely obtuse without distinct denticles. Fifth ventral lightly impressed at middle.

Rostrum ♂ half as long as body. Antennae inserted about at middle of rostrum, otherwise nearly as in the female. Ventral segments convex without visible impression on fifth.

Length 6.3 mm.; width 2.9 mm.; length of rostrum ♂ 3.3 mm. Length ♂ 6.3 mm.; width 2.9 mm.; length of rostrum ♂ 3.3 mm.

Paradise, Ariz., 1920 (H. H. Kimball); Silver City, N. Mex., June (J. B. Wallis).

Type, ♀, Cat. No. 29,016, U. S. National Museum. Type and allotype.

Nearly related to *iowensis*, differing by the male and female being nearly alike in the rostrum and point of attachment of the

antennae, the former being stouter and nearly equal in diameter and less parallel with the frons. The difference in the denticles in the sexes is probably individual.

35. *Curculio aurivestis* n. sp. (Fig. 33)

Slender oval, about two and one-fourth times as long as wide; dorsum very strongly convex. Vestiture dense, bright golden yellow, strongly irregularly banded with brown on prothorax; ventral surface pale ochereous.

Rostrum ♀ less than half as long as body, proceeding abruptly from frons, short and stout, of nearly uniform diameter, slightly enlarged at extreme base, a little more strongly at apex, feebly arcuate, arcuation gradually stronger toward apex; squamules at base extending very little beyond eyes; punctate nearly to apex. Antennae inserted more than three-sevenths of distance from base, scape shorter than first four funicular joints, first funicular fully one-fourth longer than second, second correspondingly longer than third. Prothorax about as wide as long, widest near middle, feebly sinuate toward base, basal angles acutely produced. Elytra one-fourth wider than prothorax, humeral angles not prominent. Legs rather long; femora moderately, somewhat feebly clavate, anterior pair extending beyond rostrum, posterior not beyond elytra, teeth small placed distantly from distal end with reentrant angle and apex obtuse, distal edge strongly curved, denticles distinct but neither acute nor prominent. Fifth ventral segment widely and very deeply concave at middle, especially toward apex, concavity sparsely squamulose.

Length ♀ 6.8 mm.; width 3.0 mm.; length of rostrum ♀ 3.1 mm.

Mt. Wilson, Calif., July 23, 1905 (H. C. Fall).

Type, ♀, Cat. No. 29,017, U. S. National Museum. One female.

This species is quite isolated, its distinctive characters consisting of the very short, decidedly thick, feebly arcuate female rostrum. The strongly concave fifth ventral is a character more often seen in the long-beaked groups, although present also in *baculi* and some others of the short-beaked forms.

36. *Curculio brevinasus* n. sp.

Elliptical oval, about twice as long as wide; somewhat strongly depressed; piceous, rostrum, antennae and legs rufous. Vestiture sparse, composed of long fulvous yellow

scales on dorsum, much shorter, pale gray on ventral surface; elytra with many red-brown spots, forming irregular fasciae. Eyes large and narrowly separated.

Rostrum ♀ a little more than one-half as long as body, comparatively slender and nearly uniform in diameter, proceeding somewhat abruptly from base, feebly arcuate, nearly straight in proximal half, gradually more arcuate to apex; not enlarged, punctate but not carinate at base, distinctly but not strongly dilated at apex. Antennae inserted far behind, but less than two-fifths from, middle; scape as long as first $3\frac{1}{2}$ funicular joints, the latter short and thick, 1 one-fourth longer than 2, 2 less than one-fourth longer than 3. Mandibles minute. Prothorax about as wide as long. Scutellum elongate, paler than elytra. Elytra somewhat prominent at humeri; striae well impressed; intervals flat, 2 or 3 times as wide as striae. Legs of moderate length. Femora somewhat feebly clavate, teeth rather small, denticles moderately long and acute. Tibiae moderately sinuous. Fifth ventral segment deeply widely concave in medial third.

Length ♀ 5.3 mm.; width 2.5 mm.; length of rostrum ♀ 2.8 mm.

Catalina Island, Cal., on oak (D. W. Coquillett).

Type, ♀, Cat. No. 29,018, U. S. National Museum. Unique female.

A distinctive form, somewhat resembling *uniformis*. It is more slender, the vestiture is more scanty, the rostrum in the female is shorter and thicker, and is enlarged at the apex, while the antennae are inserted nearer the middle. More closely related to *exilis*, differing especially in the darker color of the vestiture, larger and narrowly separated eyes and in the female rostrum proceeding abruptly from the head.

37. *Curculio nanulus* Cas.

♂ *Balaninus nanulus* Casey, Col. Not. VII, 1897, p. 658.

♀ *Balaninus sulcatulus* Casey, l. c., pp. 661, 662.

Narrowly elongate oval, dark piceous, legs rufescent, rostrum and antennae bright rufous. Vestiture gray or white, with variably subtransverse darker patches on elytra, where the scales become slightly less slender and very dense; scales of prothorax linear and sparse, becoming wider and denser toward the sides, broad and dense on the lower surface.

Rostrum ♀ about one-half as long as body, proceeding abruptly from the head, moderately stout, nearly straight,

feebly arcuate distally, nearly as long as elytra. Antennae inserted at basal third; scape short, not as long as first three joints of funicle, first funicular scarcely one-fourth longer than 2, 2 fully one-third longer than 3, 3 and 4 subequal. Prothorax slightly transverse, strongly arcuate at sides. Scutellum large, shield-shaped, whitish. Elytra elongate, nearly one-third longer than wide, nearly one-third wider than prothorax, evenly elongate ogival in form, somewhat obtuse apically; humeri not prominent, narrowly rounded; striae rather fine and shallow, about one-fourth as wide as intervals, the latter flat. Femora moderately clavate, feebly dentate; denticles acute, produced. Fifth ventral broadly indented in middle third.

Rostrum ♂ less than half as long as body, slightly shorter than in ♀, more distinctly subuniformly arcuate. Antennae inserted about at middle.

Length ♀ and ♂ 5.5–6.0 mm.; width 2.3–3.0 mm.; length of rostrum ♀ and ♂ 2.8–3.0 mm.

Las Vegas, N. Mex. (type, ♂, Barber and Schwarz); Koehler, N. Mex. (H. F. Wickham); Paradise, Ariz. (H. H. Kimball).

This small species is allied structurally to *baculi* by the point of insertion of the antennae. The legs are a little shorter and the femoral club and teeth more highly developed. In the female of *baculi* the rostrum is longer, also distinctly longer than that of the male, and the intervals are wider as compared with the striae. The principal differences are cited under the discussion of *baculi*. The writer has examined a fairly large series from other regions than the type locality and can find no differences, which applies also to *sulcatulus* ♀ from the same locality.

38. *Curculio striatus* n. sp.

Elongate subelliptical, moderately convex on dorsum; dark brown, head and legs reddish brown, rostrum and antennae bright rufous. Vestiture somewhat sparse, composed mainly of fine, long, overlapping, dull gray hairs, especially long on prothorax and legs, becoming dense squamiform on the elytra and venter. Elytra mottled with fine brown spots.

Rostrum ♀ four-ninths as long as body, proceeding abruptly from the head, thick, subuniform in diameter, nearly straight in proximal two-thirds, gently recurved in last third. Antennae inserted just behind proximal third. Scape a little longer than first two funicular joints, 1 considerably shorter than 2 and 3 together, 2 nearly one-fourth

longer than 3. Prothorax about as wide as long, moderately tubulate at apex; sides subparallel in basal half; base subtruncate. Elytra about one-fourth longer than wide; humeri rounded, not prominent; sides moderately arcuate, somewhat strongly convergent to apex; striae wide and deep, especially apically; intervals correspondingly narrow, convex. Scutellum very small, pale gray. Ventral segments 1 and 2 feebly separated at middle, 3 and 4 subequal in length, 5 somewhat deeply, narrowly indented at middle. Legs short, slender; femora feebly clavate, teeth very small with reentrant angle obtuse, acutely denticulate. Tibiae slender and sinuous.

Rostrum ♂ distinctly less than one-half as long as body, moderately nearly uniformly arcuate. Antennae inserted at middle. First ventral segment broadly moderately concave, fifth with semidenuded area at apex. Pygidium with long yellow hairs.

Length ♀ 6.0–6.4 mm.; width 2.8–2.9 mm.; length of rostrum ♀ 2.8 mm. Length ♂ 5.2 mm.; width 2.2 mm.; length of rostrum ♂ 2.3 mm.

Chisos Mts., Tex. (H. A. Wenzel).

Type, ♀, Cat. No. 29,019, U. S. National Museum.

Resembles *baculi* and *nanulus*, differing especially in the shorter and stouter rostrum in both sexes, the much deeper and wider elytral striae and the longer and finer scales and hairs composing the vestiture.

39. *Curculio humeralis* Cas.

Balaninus humeralis Casey, Can. Ent., 1910, p. 657.

Short fusiform; less than twice as long as wide, dark piceo-rufous, prothorax piceous; vestiture dense, short, nearly uniform, pale ochereous. Head scarcely more than two-fifths as wide as the prothorax.

Rostrum ♂ less than half as long as the body, moderately slender, evenly and distinctly arcuate, punctate and feebly carinate above toward base; antennae inserted just behind middle; first four funicular joints decreasing rather rapidly in length. Prothorax relatively rather short, fully one-half wider than long, sides subparallel, very feebly arcuate toward apex, rapidly rounded and sinuate to the distinctly tubulate apex; base broadly lobed at middle; surface moderately convex, densely and somewhat coarsely punctate. Elytra short, scarcely longer than wide, twice as long as pro-

thorax and fully two-fifths wider, sides rapidly convergent and very feebly arcuate from the prominent humeri, apex parabolic; striae moderately coarse, deep, strongly, somewhat distantly punctate, intervals wide, feebly convex, strongly and closely punctato-rugose. Femora strongly clavate, without teeth, but each with a minute and acute denticle, and with the reentrant angle strongly obtuse, the outer surface or edge long and straight. First and second ventral segments together forming a feeble concavity, fifth slightly concave at apex and tufted each side.

Length 6.5 mm.; width 3.5 mm.

Florida.

A distinct and isolated species described from the male. The facies is quite different from that of any other species, owing to the stout fusiform body, distinctly tubulate apex of the prothorax and other characters specified in the table. Unique, probably from the extreme southern part of Florida and likely to occur on neighboring islands.

ADDENDA

Because of the reasons stated in the introductory remarks in regard to the general character of the species *albidus* to the effect that the male rostrum is much longer than usual and the female is unknown, it has been thought desirable to consider the species separately because it is practically impossible to give it a zoological status. The finding of the female will doubtless serve to solve this problem.

40. *Curculio albidus* n. sp.

Elongate oval, twice as long as wide, somewhat depressed; rufo-piceous, rostrum, antennae and legs rufous. Vestiture nearly uniform whitish gray, dense and very coarse except on legs and head, composed of coarse and slender squamules with darker spots faintly indicated on elytra.

Rostrum ♂ five-sixths as long as body, thick, scarcely enlarged at base, somewhat strongly at apex, nearly uniformly and moderately arcuate. Antennae inserted just behind middle; first funicular joint fully one-third longer than second, 2 and 3 subequal. Mandibles of medium size. Prothorax about as wide as long, wide at apex. Elytra one-third wider than prothorax, about two-thirds as wide as long; striae wide, deep; intervals nearly flat and narrow, only as wide to twice

as wide as striae. Legs long; femora feebly clavate; teeth small, reentrant angles widely obtuse, denticles very minute but acute. First ventral segment broadly, somewhat feebly concave, fifth convex. Pygidium with somewhat tube-like brush of hairs.

Length ♂ 4.5 mm.; width 2.2 mm.; length of rostrum ♂ 3.8 mm.

Oracle, Ariz., July 10 (Hubbard and Schwarz).

Type, ♂, Cat. No. 29,002, U. S. National Museum.

Since the female is unknown, the length of the rostrum is problematical, hence it is impossible to correlate the species with any other beyond peradventure. It bears some resemblance to *gracilis* and *wenzeli* but is smaller than either, the male rostrum is much longer, the point of attachment of the antennae is farther from the middle and the second and third funicular joints are subequal.

Since the above was sent to the printer, the writer has been able to study through the loan of H. C. Fall two sexes of species not previously described. These descriptions are added.

36. *Curculio aurivestis* Chtttn.

Rostrum ♂ less than one-half as long as the body, with tendency to proceed subparallelly from the frons; squamules at base extending well beyond the eyes. Antennae inserted far in front of the middle; scape longer than first 4 funicular joints. Fifth ventral segment very feebly concave at middle, with squamules much shorter. Pygidium moderately hairy forming a brush. The remaining characters correspond very closely to those furnished on a preceding page of the female.

Length ♂ 6.0 mm.; width 2.8 mm.; length of rostrum ♂ 2.2 mm.

Santa Clara County, Calif. (Coquillett). Forest Grove, Oregon (M. M. Recher).

Allotype, ♂, Cat. No. 29,017, U. S. National Museum.

The type is a single female. Another female (paratype) in the Fall collection has a slightly longer rostrum and distinctly longer legs but the former is robust as in *aurivestis* and agrees in other respects.

37. *Curculio brevinasus* Chtttn.

Rostrum ♂ distinctly less than one-half as long as the body, more enlarged at apex than in ♀, proceeding much

less abruptly from, nearly continuous with, frons, and of similar curvature. Antennae inserted well in front of, but less than two-thirds from, the middle; scape longer than first 4 funicular joints, 1 fully one-fourth longer than 2; 2 scarcely longer than 3. Fifth ventral segment feebly concave at middle of basal portion. Pygidium hairy.

Length ♂ 5.0 mm.; width 2.5 mm.; length of rostrum ♂ 2.2 mm.

Catalina Id., Cal., August 22, 1892 (H. C. Fall).

Allotype ♂ in Mr. Fall's collection.

The type is a female and the male was previously undescribed.

Because of considerable resemblance between this species and *exilis*, the following table is added to expedite their recognition:

brevinasus

Rostrum ♀ less than $\frac{1}{2}$ as long as body, proceeding somewhat abruptly from head.

Eyes large, narrowly separated.

Dorsal vestiture coarse and sparse, especially on prothorax; elytra dark, not spotted; humeri prominent; striae coarse and wide.

Catalina Island, Calif.

exilis

Rostrum ♀ more than $\frac{1}{2}$ as long as body, subparallel with frons.

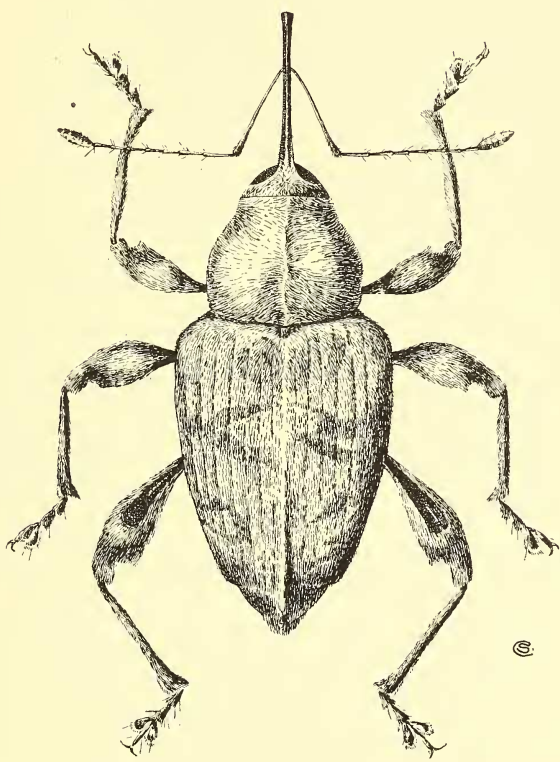
Eyes small, widely separated.

Dorsal vestiture fine, dense; elytra gray with pale wide transverse fasciae; humeri not prominent; striae fine and narrow.

Ottawa, Ontario, Canada.

PLATE XII

Plate XII, Fig. 1.—*Curculio iowensis*, much enlarged.

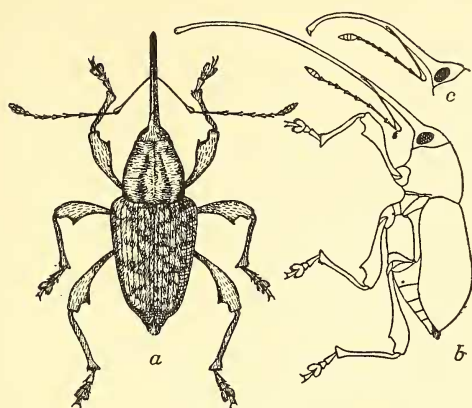


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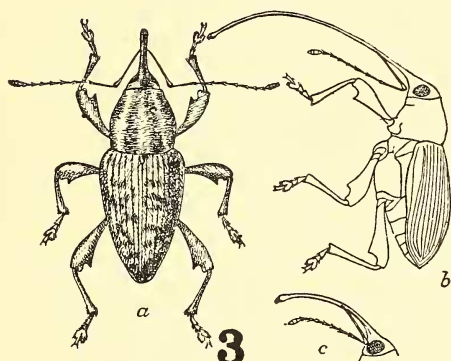
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PLATE XIII

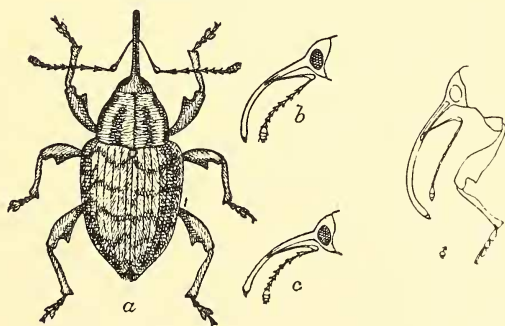
Plate XIII, Fig. 2.—*Curculio proboscideus*: *a*, female, dorsal view; *b*, female, lateral outline; *c*, male. 3. *auriger*: *a*, *b*, ♀ *c*, ♂. 4. *obtusus*: *a*, *b*, ♀; *c*, ♂. 5. *pardalis* ♂—all several times natural size.



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PLATE XIV

Plate XIV, Fig. 6.—*Curculio macrodon* ♀ ; 7. *longidens* ♂ ; 8. *longidens* ♀ ; 9. *caryae*; *a*, ♀, dorsal view; *b*, ♀, lateral view; *c*, ♂.

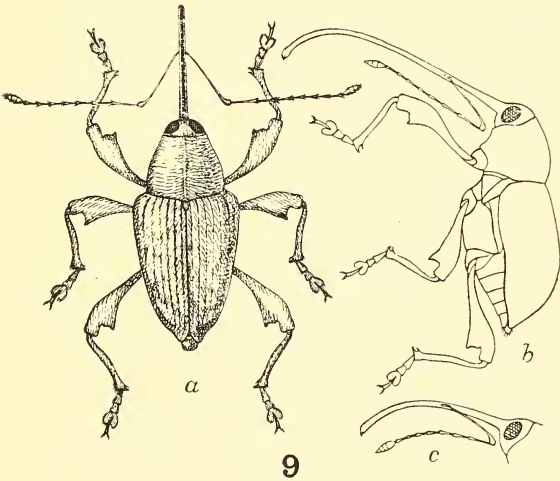
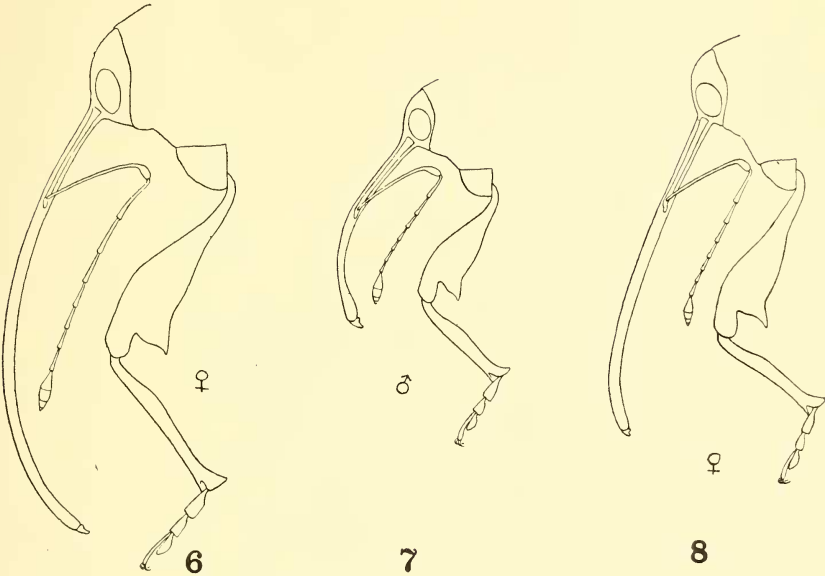
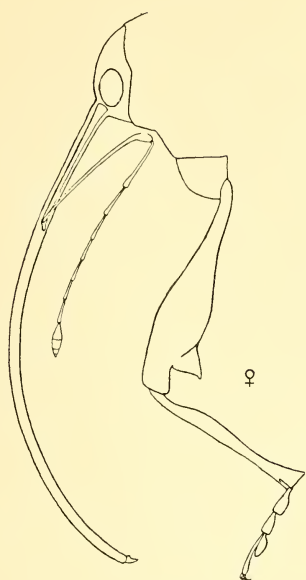
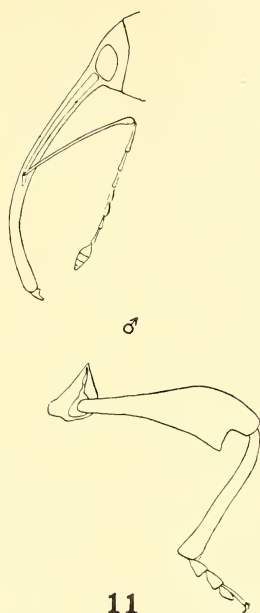


PLATE XV

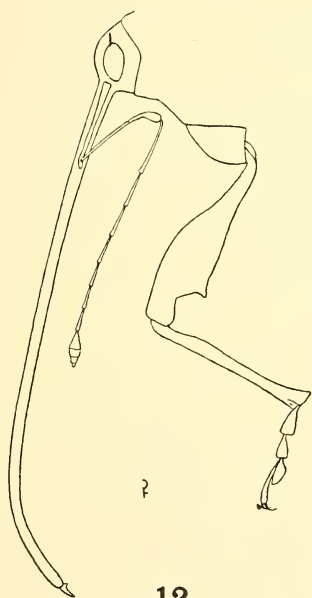
Plate XV, Fig. 10.—*Curculio nasicus* ♀ ; 11. *nasicus* ♂ ; 12. *rectus* ♀ ; 13. *orthorhynchus* ♀ .



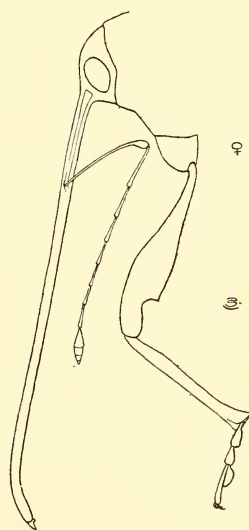
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PLATE XVI

Plate XVI, Fig. 14.—*Curculio longinasus* ♂ ; 15. *longinasus mandibularis* ♂ ; 16. *multifasciatus* ♂ ; 17. *pardus* ♀ ; 18. *wenzeli* ♀ ; 19. *q. griseae* ♀ .

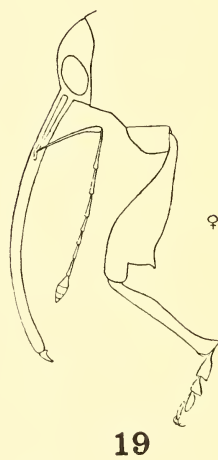
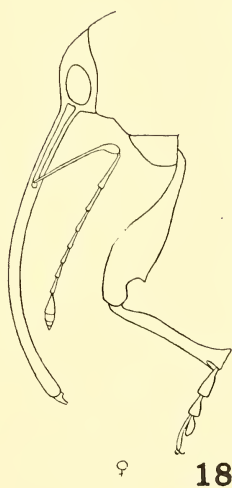
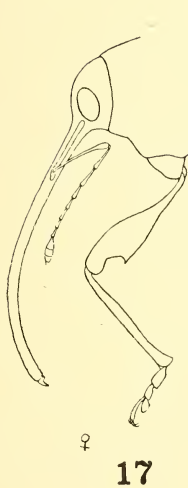
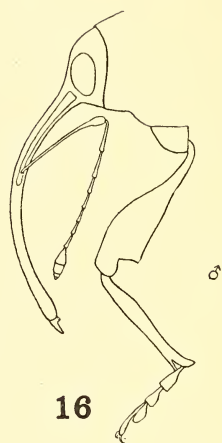
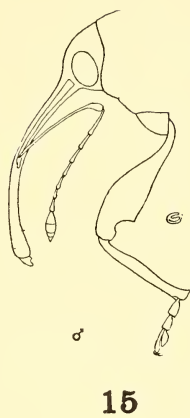
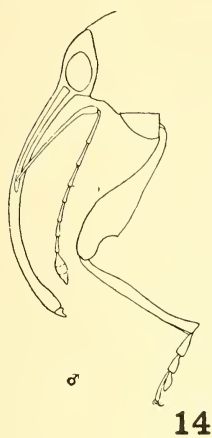
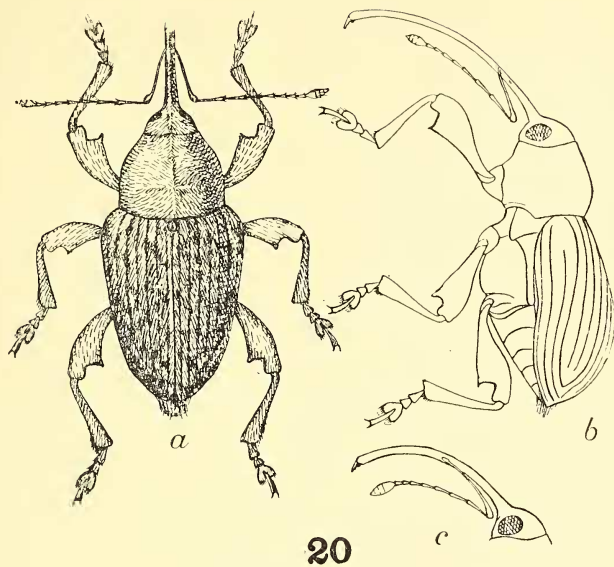
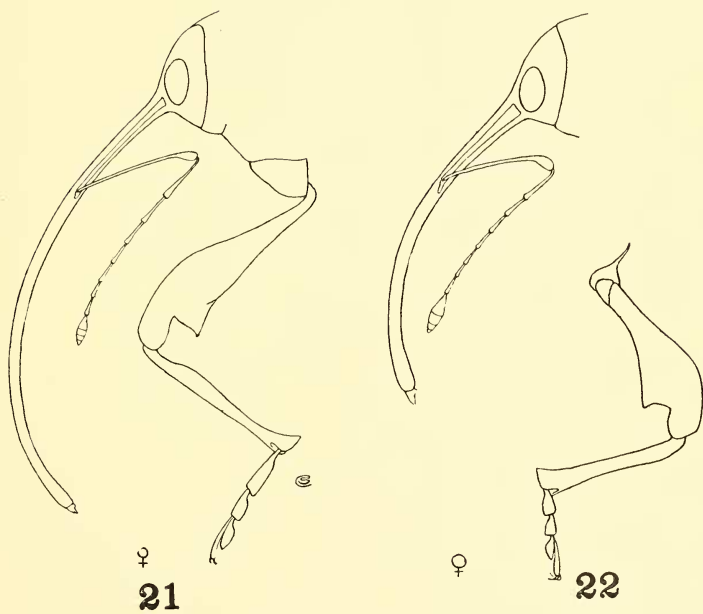


PLATE XVII

Plate XVII, Fig. 20.—*Curculio victoriensis*: *a*, ♀ dorsal view; *b*, ♀ lateral view; *c*, ♂ head; 21. *strictus* ♀; 22. *confusor* ♀, posterior femur.



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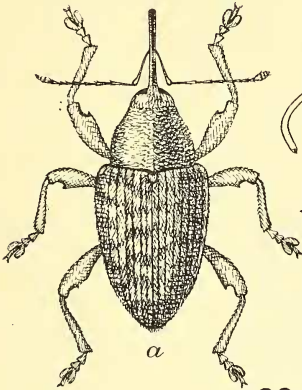


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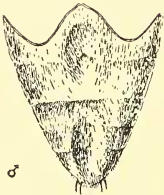
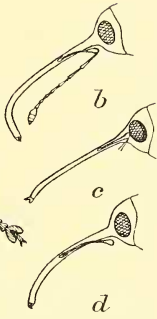
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PLATE XVIII

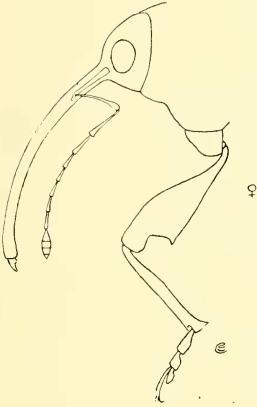
Plate XVIII, Fig. 23.—*Curculio baculi*: *a*, ♀; *b*, ♀ typical rostrum; *c*, var. *curtus* rostrum; *d*, ♂ rostrum; 24. *confusor*, ventral segments ♂; 25. *parvidens* ♀; 26. *cervulinus* ♂; 27. *undulatus* ♂.



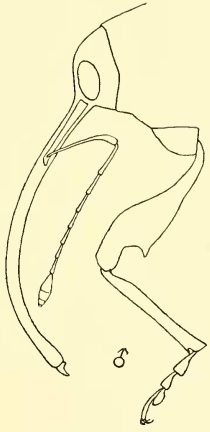
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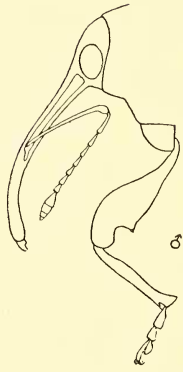
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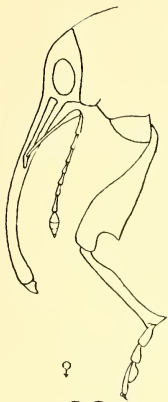
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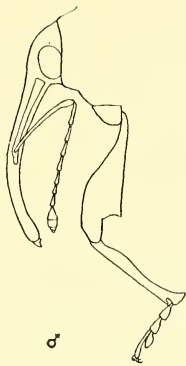
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PLATE XIX

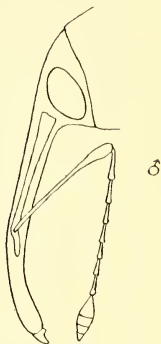
Plate XIX, Fig. 28.—*numenius* ♀ ; 29. *funicularis* ♂ ; 30. *iowensis* ♂ ; 31. *iowensis* ♀ ; 32. *monticola* ♀ ; 33. *aurivestis* ♀ .



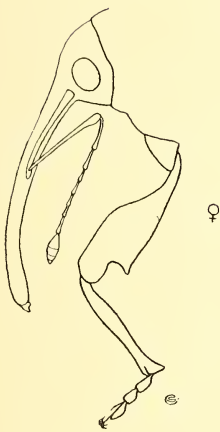
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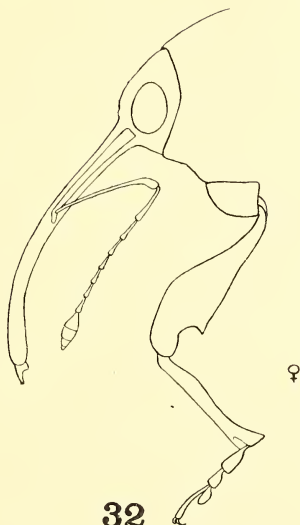
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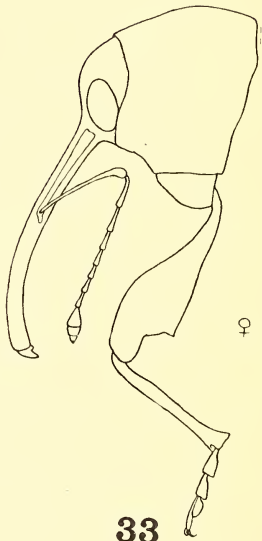
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